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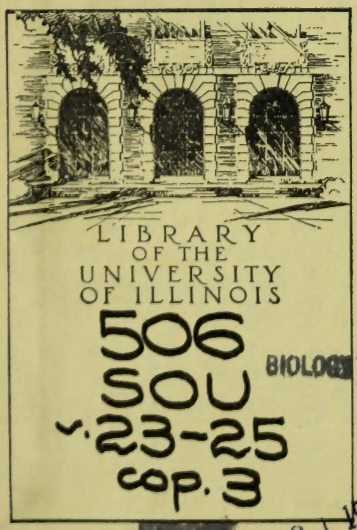

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REPORT

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

VOL. XXIII.

For 1898-99.

[With Ten Plates.]

EDITED BY PROFESSOR R. TATE.

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PAGE 45: Under Chalcopterus gracilicornis *insert* N.W. Australia.

PAGE 48: Under C. mundus *insert* N. Queensland.

PAGE 55: Under Emenadia difficilis *insert* S. Australia.

PAGE 209: 21 lines from top, 3 and 5 lines from bottom, *for* unguinal *read* ungual.

A List of the Libellulidæ (Dragon Flies) of Australasia.

By J. G. O. Tepper, F.L.S., F.S.Sc., &c.

With Annotations on South Australian Species.

By Mons. René Martin.

[Read May 2, 1899.]

The Libellulidæ form a part of the Odonata or Pseudo-Neuroptera. They are classed now with the Orthoptera, but were formerly included among the Neuroptera, which they resemble in appearance of the mature forms, but their metamorphosis is quite different. The Thripsidæ, Psocidæ, Embidæ, Termitidæ, Perlidæ, and Ephemeridæ embrace the remaining families.

Very little appears to have been published hitherto in Australia on the species of Odonata occurring endemically in this region, excepting several papers by Mr. W. W. Froggatt in Proc. Linn. Soc., N.S.W. (vol. X., 1895-6), on the "Termites" or "White Ants." The chief reasons for this paucity are that not only are the specimens rather difficult to capture, collect, and preserve, but that the literature relating to the suborder is so widely scattered in mostly foreign publications as to be almost inaccessible for any local student. The means are therefore lacking to learn which forms are known to occur in the district or province, or to classify them when collected. To meet this want to some extent this list of the most important and conspicuous family has been drawn up, as a preliminary step towards a better knowledge.

Naturally the work is somewhat imperfect, it being quite impossible for one not in possession either of all the necessary literature or extensive collections to discriminate whether a species appearing in various genera, under different authors, or from dissimilar localities (or *vice versa*), be one and the same or not, or whether different species have been included under similar names. This can ultimately only be determined by European workers to whom both literature and collections are accessible.

The present list is chiefly based on the essays of Fr. Brauer, published in the "Verhandlungen der Botan. und Zool. Gesell-

schaft, Wien," between 1862 and 1868, and the "Zoological Record" from 1868 to 1897. A few species were gleaned from Burmeister's "Handbuch," 1838, and one from the British Museum Catalogue. The dates attached refer to the earliest notice observed in the works above cited.

The arrangement of the genera follows mainly that of Brauer's "Verzeichniss" (Abh. Bot. u. Zool. Ges. 1868).

Respecting the numerical extent of the Libellulidæ, it may be remarked that in 1871 Selys recorded (as known) some 1,357 species, but may have been considerably added to since. The Australian species, of which 139 in 65 genera are listed below, appear to be those least known; and it is hoped that this paper may lead to a better study of the family ere rendered impracticable through more or less total extinction, with which all endemic life in Australia is threatened, either directly or indirectly.

The Dragon-flies attract the attention of many persons, partly on account of the large size of some, the brilliant colours of some of the smaller, and the ceaseless graceful flight of most, and partly through the groundless fear of injury, which produced the vernacular name of "Horse-stingers" for them; yet they are rarely taken by collectors. They deserve, however, serious study on account of the important rôle they act in Nature as tireless consumers of flies, mosquitoes, and other large and small insects wherever water more or less abounds.

The larvæ and nymphs are wholly aquatic, living in fresh to brackish stagnant pools, ponds, or morasses. Whenever practicable to connect them with the mature form they should be collected also, at least the cast skin of the nymph, which the imago leaves attached to some object on emerging. They are very much stouter in body than the latter, move about in the water by walking on the bottom, climbing plants, &c., and contribute largely to the reduction of other and more noxious insect life.

During 1898 specimens of the South Australian Libellulidæ were sent by permission of the Board of Governors to Mons. René Martin (Le Blanc, Indre, France), a noted specialist, who kindly identified them, and furnished the notes which are indicated under each species-name by inclusion within inverted commas (" "). These I have supplemented by remarks, &c., and the localities whence the specimens in the Museum collection were obtained. The species hitherto recognised in South Australia, and of which specimens are in the Museum collection, are denoted by an asterisk.

SUBORDER ODONATA (PSEUDO-NEUROPTERA).

FAMILY I.—LIBELLULIDÆ.

Subfamily 1. — Libelluninæ.

Pantala flavescens, *Fabricius*. New South Wales, Fiji, New Caledonia, Tahiti (Brauer, 1864-8; R. Martin, 1896). The species is widely distributed in the Old World, being met with from Europe to Kamschatka, and reported from Natal.

*Tramea carolina, *L.* Northern Territory of S.A., New Caledonia, India, America (Brauer, 1864-8).

Tramea Loewi, *Brauer* (1866). Queensland, Ceram.

Tramea brevistyla, *Brauer* (1865). New South Wales.

Tramea transmarina, *Brauer* (1866). Fiji.

Tramea samoensis, *Brauer* (1866). Samoa.

Rhyothemis (Celithemis) apicalis, *Kirby*. New Hebrides (Zool. Rec., 1889).

Rhyothemis (Celithemis) chalcoptilon, *Brauer*. Samoa (1868).

Rhyothemis (Celithemis) pygmæa, *Brauer* (1866-8). New Guinea.

Rhyothemis Chloë, *Kirby*. Queensland (Z.R., 1894).

Rhyothemis crapula, *Brauer*. Fiji.

Rhyothemis graphiptera, *Rambur*. Queensland (Br., 1868).

Rhyothemis dispar, *Brauer* (1867). Fiji.

Rhyothemis princeps, *Kirby*. Queensland (Z.R., 1894).

Rhyothemis resplendens, *Selys*. Queensland, New Guinea (Z.R., 1878).

Rhyothemis Turneri, *Kirby*. Queensland (Z.R., 1894).

Zyxomma multinervis, *Carpenter*. New Guinea (Z.R., 1897).

Zyxomma (Tholymis) tillarga, *Fabr.* Tahiti, Samoa, India, Chili, Madagascar, Mauritius (Br., 1868).

Perithemis (Microthemis) Duivenbodei, *Brauer* (1866). New Guinea.

Calothemis (Orchithemis) Meyeri, *Selys*. New Guinea (Z.R., 1878).

Neurothemis elegans, *Guérin*. New Guinea (Brauer, 1866).

Neurothemis fluctuans, *Burmeister*, 1838; Brauer, 1866. Pelew Islands.

Neurothemis innominata, *Brauer* (1867). New Guinea, Ceram. (To this species belongs *N. diplax*, Br., as a heteromorphous form.)

Neurothemis oligoneura, *Brauer* (1867). North Australia.

Neurothemis oculata, *Fabricius*. North Australia (Brauer, 1867).

Urothemis nigrilabris, *Selys*. New Guinea (Z.R., 1878).

*Nesoxenia *Libellula*) braminea, *Fabr.* Australia (S.A.), India, &c. (Brauer, 1868). Colour bright-blue when alive; expanse of wings, 3-3½ in. (75 mm.). "Un mâle d'Adelaide.

L'espèce habite les Indies orientales et l'Australie. Elle parait être commune dans New South Wales." Specimens obtained at Magill and Mount Lofty.

Nesoxenia (*Libellula*) cingulata, *Kirby*. Alu Islands (Z.R., 1889).

Prothorthemis Wahnesi, *Foerster*. New Guinea (Z.R., 1897).

Trithemis festiva *(infernalis)*, *Brauer*. New Guinea, India, &c. (Brauer, 1868).

Orthemis pectoralis, *Brauer* (1868). Fiji, Ceram.

Nesocria Woodfordi, *Kirby*. Solomon Islands (Z.R., 1889).

Crocothemis (Hydronympha) servilia, *Drury*. Queensland, China, India (Brauer, 1868).

Hydronympha (Orthetrum) nigrifrons, *Kirby*. Queensland (Z.R., 1894).

Brachydiplax denticauda, *Brauer* (1868). New Guinea.

Brachymesia australis, *Kirby*. Queensland (Z.R., 1889, 1894).

Diplacina smaragdina, *Selys*. New Guinea (Z.R., 1878).

Libella (Hydronympha) caledonica, *Brauer*. Queensland (1868).

Lepthemis sabina, *Drury*. North-Eastern Australia, Fiji, Java, Celebes, India, China, Japan, Philippine Islands; and some varieties in Arabia, Syria, and Asia Minor.

Erythemis oblita, *Rambur*. South and Central Australia (Brauer, 1868).

Erythemis haematodis, *Burm.*, (? oblita, var.) .Australia (Brauer, 1868).

*Erythemis (Trithemis) rubra, *Kirby*. Australia (S.A.), New Guinea (Z.R., 1889). Colour of male when alive bright to dull-red, of female ochre-yellow. Expanse of wings, $1\frac{3}{4}$ ins. to $2\frac{1}{4}$ ins. (40 to 56 mm.). Specimens from Adelaide and Magill. "Un mâle. Elle habite toute l'Australie et probablement la New Guinea et les iles voisines."

*Erythemis sp. Adelaide, South Australia. Wings brownish, body stouter than that of the last, colour yellowish.

Diplax bipunctata, *Brauer*. Queensland, New Caledonia, Samoa (1868).

Diplax *(Trithemis)* trivialis, *Rambur*. Queensland, N. Guinea, Fiji, Java (Brauer, 1866).

Nannodiplax rubra, *Brauer*. Queensland (Brauer, 1868).

Nannodiplax Finschi, *Karsch*. New Guinea (Z.R., 1889).

Nannophya australis, *Brauer*. New South Wales (1865).

Nannophya (?) pygmæa, *Rambur*. Queensland, Amboyna, Malacca, &c. (Brauer, 1868).

Nannophya (?) exigua, *Hagen*. Queensland, Celebes (Brauer, 1868).

Nannodythemis australis, *Karsch*. Australia (Z.R., 1889).

Nannothemis (? = Nannophya) australis, *Brauer*. New South Wales (1868).

SUBFAMILY 2.—CORDULINÆ.

Epopthalmia (Cordulia) elegans, *Hagen.* Australia, China, &c. (Brauer, 1864).

popthalmia (Cordulia) australis, *Hagen.* Australia, Celebes (Brauer, 1868).

Cordulia novæzealandiæ, *Brauer;* (Smithii, *White*). New Zealand (Brauer, 1864).

Hemicordulia affinis, *Selys.* North-Western Australia (Z.R., 1871).

Hemicordulia assimilis, *Selys.* Solomon Islands, Celebes (Z.R., 1871).

*Hemicordulia australasiæ, *Rambur.* Queensland (Brauer, 1868).

Hemicordulia fidelis, *Selys.* Loyalty Islands (Z.R., 1886).

*Hemicordulia intermedia, *Selys.* South Australia, Queensland (Z.R., 1871).

Hemicordulia Jacksoniensis, *Rambur.* Australia (Brauer, 1868).

Hemicordulia novæhollandiæ *Selys.* Australia (?).

Hemicordulia oceanica, *Selys.* Tahiti (Brauer, 1868).

*Hemicordulia tau, *Selys.* Australia (S.A. incl.) (Brauer, 1868).

"Le genre *Hemicordulia*, remarkable en ce que les mâles ont le bord anal des ailes inferieures arrondi, comprend une douzaine d'espèces. Parmi elles, deux habitent Madagascar et Maurice, une autre voisine les iles Seychelles. Dans l'Inde, on a observe une autre espèce, de même qu' une autre se trouve assez communement à Java. Contes les autres habitent les iles australes ou le grand continent Australien. Ainsi, l' *oceanica*, Selys, a ète prise â Taïti, *assimilis*, Selys, à Celebes et dans le iles Solomon, *fidelis*, M'Lachlan, les iles Loyauté, les quatre dernierés espèces ont ète trouve en Australie."

"Les *H. australiæ*, Rambur, et *H. novæhollandiæ*, Selys, ne portent pas sur le front une tache en forme de I (Greek *tau*), tandis que *H. intermedia* et *H. tau*, Selys, à la tache noire du front en forme de I plus on mois épais. Enfin *H. intermedia* se distingue de notre espèce '*tau*' par une bande jáune en demi-aureau on second segment de l' abdomen. Le taille de toutes espèces est à peu pres la même."

Epitheca (Cordulia) Grayi, *Selys.* New Zealand, (?) Australia (Z.R., 1871).

Epitheca (Cordulia) Braueri, *Selys.* New Zealand (Z.R., 1871).

*Synthemis eustalacta, *Burmeister.* South Australia, Victoria, &c. (Brauer, 1868). A specimen from Wilmington appears to represent another species. "Le groupe *Synthemis*, reconnaissable par ceque les espâces basilaire et median sont rèticulés avec quatre ailes, est absolument Australien et n' a jamais ète observe qu' en Australie, ou iles Fiji et de la N. Caledonie."

"*S. eustalacta* a été observé sur plusieurs points du continent et parait assez rare partout."

Synthemis miranda, *Selys.* New Caledonia (Z.R., 1871).
Synthemis macrostigma, (*Hagen*) *Selys.* Fiji (Z.R., 1871).
Synthemis Leachi, *Selys.* Australia (Brauer, 1868; Z.R., 1871).
Synthemis guttata, *Selys.* Australia (Brauer, 1868; Z.R., 1871).
Synthemis brevistyla, *Selys.* Queensland (Z.R., 1871).
Synthemis regina, *Selys.* Queensland (Z.R., 1874).
Synthemis virgula, *Selys.* Victoria (Z.R., 1874).
Cordulephya pygmæa, *Selys.* Victoria (Z.R., 1871).

FAMILY II.—ÆSCHNIDÆ.

Subfamily 1. — Gomphinæ.

*Austrogomphus Guérini, *Rambur.* S. Australia, &c., Tasmania (Brauer, 1868).
*Austrogomphus collaris, *Selys.* Australia (Brauer, 1868).
Austrogomphus (? Hemigomphus) ochraceus, *Selys.* Victoria (Z.R., 1869).
Austrogomphus (? Hemigomphus) amphiclitus, *Selys.* Queensland (Z.R., 1873). "Les quatre espèces qui composent le genre *Austrogomphus* sont propre a l'Australie. Le *A. Guérini* habite aussi la Tasmanie."
Hemigomphus lateralis, *Selys.* North Australia (Z.R., 1873).
Ictinus australis, *Selys.* Queensland (Z.R., 1871).
Petalura (Diastatomma) gigantea, *Leach.* Australia (Brauer, 1864).
Uropetala Carovei, *White.* New Zealand (Burmeister, 1838; Brauer, 1864).

Subfamily 2.—Æschninæ.

Anax guttatus, *Burmeister.* N. Guinea, India, Java, Seychelles, &c. (R. Martin, Mem. Soc. Zool. de France, IX., p. 105).
*Hemianax (Æschna; Anax) papuensis, *Burm.* (*congener*, Ramb.). Northern Territory, S.A. (nec Adelaide), N.S. Wales, Queensland (Brauer, 1864). There is also one specimen each from Blinman, S.A., and Fremantle, W.A. Colour, grey, with black and yellow markings; expanse, 4 ins. (95-102 mm.). Another still larger species, of which a defective specimen is in the collection, is possibly *Petalura gigantea.*
Acanthagyna subinterrupta, *Rambur.* New Guinea (Brauer, 1866). (*Acanthagyna, Kirby*, is intended to replace *Gynacantha, Selys*, nec Rambur.)
Æschna brevistyla, *Rambur.* New Zealand (Brauer, 1864).
Æschna tahitensis, *Brauer.* Tahiti (1865).

*Austroæschna parvistigma, *Selys.* South Australia, Victoria, N.S. Wales (Z.R., 1883). This is the largest of the commoner of the S.A. species, resembling *H. papuensis* in general aspect, and is occasionally seen in great number at the sea coast (Ardrossan, 1880) and the vicinity of larger expanses of water. "Cette espèce semble assez commune dans les differents contreés du continent Australien, notamment en Victoria et New South Wales."

*Austroæschna (?) sp. S. Australia; locality unknown. Colour of all the wings clear brown; size rather larger than preceding.

FAMILY III.—AGRIONIDÆ.

SUBFAMILY 1.—CALOPTERYGINÆ.

Hemiphlebia mirabilis, *Selys.* Queensland (Z.R., 1869).

Rhinocypha tincta, *Rambur.* New Guinea, Philippine Islands (Brauer, 1866).

Diphlebia sp. Australia. "La subfamily Calopteryginæ n'est representeé en Australie que par le genre *Diphlebia* qui comprend une espèce, et par quelque rares espèces de plusieurs autres genres. Certaines groupes de cette son famille sont pourtant fortement représentès à Celebes et même à la New Guinea."

SUBFAMILY 2.—AGRIONINÆ.

Amphipteryx lestoides, *Selys.* Queensland (Brit. M.C., p. 654).

Archibasis (Stenobasis) occipitalis, *Selys.* New Guinea (Z.R., 1877).

*Lestes analis, *Rambur.* "Egalement in South Australia et Victoria."

*Lestes annulosa, *Selys.* South Australia, Victoria (Brauer, 1864). "Jolie espèce observeé en Victoria et S.A., sur les marecages."

Lestes albicauda, *McLachlan.* New Guinea (Z.R., 1895).

Lestes Colensonis, *White.* New Zealand (Brauer, 1864).

Lestus Leda, *Selys.* Queensland (Brauer, 1868).

There are two or three undetermined species besides the above in South Australia, of which specimens are in the collection from the Lakes and Kangaroo Island.

Synlestes Weyeri, *Selys.* Queensland (Z.R., 1869).

Argiolestes obscura, *Selys.* New Guinea (Z.R., 1878).

Argiolestes ornata, *Selys.* New Guinea (Z.R., 1878).

Argiolestes pallidistyla, *Selys.* New Guinea (Z.R., 1878).

Argiolestes postnodalis, *Selys.* New Guinea (Z.R., 1878).

Argia australis, *Guérin.* New South Wales (Brauer, 1864).

Onychargia flavovittata, *Selys.* New Guinea (Z.R, 1878).

Onychargia rubropunctata, *Selys.* New Guinea (Z.R., 1878).

Ischnura (Agrion) aurora, *Brauer*. Tahiti, Samoa (1865).
Ischnura distigma, *Brauer*. Queensland (1868).
Ischnura spinicauda, *Brauer*. Polynesia (1865).
Ischnura tahitensis, *Selys*. Tahiti (Z.R., 1878).
Pericnemis annulata, *Brauer*. Samoa (1868).
Idiocnemis bidentata, *Selys*. New Guinea (Z.R., 1878).
Idiocnemis inornata, *Selys*. New Guinea (Z.R., 1878).
Agrion æruginosum, *Brauer*. Queensland (1868).
Agrion cingillum, *Brauer*. Queensland (1868).
Agrion cingulatum, *Burmeister*. Australia (Handb., 823, 1838).
Agrion heterostictum, *Burmeister*. Australia (Handb., 820, 1838).
Telebasis eximia, *Selys*. New Guinea (Z.R., 1878).
Telebasis Laglazei, *Selys*. New Guinea (Z.R., 1878).
Telebasis recurva, *Selys*. New Guinea (Z.R., 1877).
Telebasis sobrina, *Selys*. New Zealand (Z.R., 1873).
Telebasis (Teinobasis) zealandica, *McLachlan*. New Zealand (Z.R., 1873).
Agriocnemis exsudans, *Selys*. New Caledonia, Labuan, Java (Z.R., 1877).
Agriocnemis australis, *Selys*. Queensland (Z.R., 1877).
Argiocnemis nigricans, *Selys*. New Guinea (Z.R., 1877).
Argiocnemis rubescens, *Selys*. Queensland (Z.R., 1877).
Platysticta auriculata, *Selys*. New Guinea (Z.R., 1878).
Platysticta bicornuta, *Selys*. New Guinea (Z.R., 1878).
Alloneura erythroprocta, *Selys*. New Guinea (Z.R., 1886).
Alloneura Wallacei, *Selys*. New Guinea (Z.R., 1886).
Caconeura eburnea, *Foerster*. Key Islands, New Guinea (Z.R., 1895).
Caconeura finisterræ, *Foerster*. New Guinea (Z.R., 1895).
Isosticta (*Alloneura*) spinipes, *Selys*. New Caledonia (Z.R., 1885).
Xanthagrion antipodum, *Selys*. New Zealand (Z.R., 1878).
Xanthagrion zealandicum, *Selys*. New Zealand (?).
Xanthagrion sp. New Zealand.
*Xanthagrion erythroneurum, *Selys*. South Australia, Victoria (Z.R., 1878). This, the smallest of the S.A. species, is remarkable for the bright red and green tints of the males, and has been obtained at Adelaide, Goolwa, and Strathalbyn. "Cette espèce qui habite, Melbourne, Adelaide et un grand nombre de points sur le continent Australien, est très commune en Victoria, dans les marais et sur les etangs en Octobre-Novembre. Les males semblent être plus nombreux que les femelles ; ce qui est un ces frequent chez beaucoup d'espèces d' Odonates."

"C'est la seule espèce du genre qui soit purement Australienne, le trois autres espèces habitent New Zealand."

Notes on Australian Lepidoptera.

By A. Jefferis Turner, M.D., F.E.S.

[Read May 2, 1899.]

ARCTIADÆ.

The present paper is preliminary to a revision of the Australian species belonging to this family. I take the opportunity of making the following corrections in nomenclature :—

Tigrioides splendens, Luc.	= *Œonistis* entella*, Cr.
Brunia repleta, Luc.	= *Tigrioides repleta*, Luc.
Brunia intersecta, Luc.	= *Xylorycta porphyrinella*, Walk. (*Tineina, Xyloryctidæ*)
Sorocostia interspersa, Luc.	= *Mosoda interspersa*, Luc
Chiriphe anguliscripta, Luc.	= *Goniosema anguliscripta*, Luc.
Comarchis equidistans, Luc.	= *Chiriphe equidistans*, Luc.
Comarchis obliquata, Luc.	= *Scaeodora obliquata*, Luc.
Comarchis lunata, Luc.	= *Scaeodora lunata*, Luc.
Anestia inquinata, Luc.	= *Anestia ombrophanes*, Meyr., var.
Spilosoma brisbanensis, Luc.	= *Spilosoma fuscinula*, Dbld., var.
Spilosoma quinquefascia, Luc.	= *Spilosoma fuscinula*, Dbld.
Calligenia pilcheri, Luc.	= *Enaemia dives*, Walk. (*Tineina, Hyponomeutidæ*)
Nudaria albida, Walk.	= *Phaneropseustis albida*, Walk.
Nudaria obducta, Luc.	= *Phaneropseustis obducta*, Luc.
Nudaria mollis, Luc.	= *Psilopepla mollis*, Luc.
Nudaria macilenta, Luc.	= *Thallarcha macilenta*, Luc.
Spilosoma frenchi, Luc.	= *Spilosoma erythrastis*, Meyr.
Thallarcha phaedropa, Meyr.	= *Thallarcha phalarota*, Meyr. (female)

I have not yet been able to examine many of the species described by Dr. Lucas, but the following are, I believe, correctly referred :—

Scoliacma iridescens, Luc.	*Sorocostia mesozona*, Meyr.
Scoliacma cervina, Luc.	*Sorocostia argentea*, Luc.
Tigrioides transcripta, Luc.	*Mosoda venusta*, Luc.
Thrypticodes xyloglypta, Meyr.	*Pelobrochis rava*, Luc.
Sarrothripa punctata, Luc.	*Diphtheraspis modicus*, Luc.

* This is, however, not a true *Œonistis*, according to the definition in Meyrick's Handbook.

TIGRIOIDES XANTHOPLEURA, *n. sp.*

Male, 30-32 mm. Head ochreous-yellow, sometimes with a slatey-grey bar on vertex and collar. Antennæ pale-fuscous. Thorax slatey-grey. Abdomen ochreous. Legs slatey-grey; posterior tibiæ and tarsi pale-ochreous. Forewings elongate, posteriorly dilated, costa moderately arched, apex obtuse, hindmargin rounded, slightly oblique; pale slatey-grey; a pale-ochreous line along whole of costa, broadest at base, narrowing towards apex. Hindwings and cilia pale-ochreous-yellow.

Brisbane; several specimens in August.

TIGRIOIDES ACOSMA, *n. sp.*

Male, 30 mm. Forewings with vein 2 from near angle, 3 and 4 stalked, 5 absent, 8 and 9 out of 7, 11 anastomosing with 12. Hindwings with 4 and 5 absent, 6 and 7 stalked, 8 from middle of cell.

Head and thorax orange-ochreous. Antennæ fuscous, towards base pale ochreous. Abdomen grey; lower surface and tuft orange-ochreous. Legs pale ochreous; anterior and middle tibiæ and tarsi tinged with fuscous. Forewings elongate, somewhat dilated, costa moderately arched, apex rounded, hindmargin somewhat obliquely rounded; pale ochreous, somewhat fuscous-tinged, without markings, cilia pale ochreous. Hindwings and cilia pale ochreous.

Differs from most of the genus in vein 2 of forewings arising from near angle of cell; but there is considerable variation in the genus in the place of origin of this vein. The point mentioned will prove useful in distinguishing this from *T. nana*, Walker, another unicolorous species, in which vein 2 is from middle of cell.

Johnstone River, North Queensland; one specimen in the collection of Mr. R. H. Relton.

ÆDŒA, *n. g.*

Tongue present. Antennæ in male filiform, shortly ciliated (two-thirds), with scattered longer cilia. Palpi minute. Forewings with vein 2 from two-thirds, 3 and 4 stalked, 5 absent, 8 and 9 by a common stalked out of 7, 11 separate. Hindwings with 3 and 4 stalked, 5 absent, 6 and 7 stalked, 8 from middle of cell.

Distinguished from *Tigrioides*, Butler, by the absence of anastomosis between veins 11 and 12 of forewings.

ÆDŒA MONOCHROA, *n. sp.*

Male and female, 17-18 mm. Head, antennæ, and thorax yellow-ochreous. Abdomen ochreous-whitish; tuft yellow-ochreous. Legs pale fuscous; posterior tibiæ and tarsi pale ochreous. Fore-

wings elongate, somewhat dilated, costa moderately arched, apex rounded, hindmargin somewhat obliquely rounded; uniform yellow-ochreous; cilia pale ochreous. Hindwings and cilia pale ochreous.

This species might be easily mistaken for small specimens of *Tigrioides nana*, Walker, if attention were not paid to neuration.

Brisbane; two specimens in January and April.

Calligenia saginaea, *n. sp.*

Male, 20 mm. Head pale-yellowish. Antennæ whitish. Thorax pale-yellowish, with two grey spots anteriorly, and two more on bases of patagia. Abdomen whitish. Legs ochreous-whitish; apical two-thirds of anterior and middle tibiæ fuscous. Forewings posteriorly dilated, costa moderately arched, apex rounded, hindmargin very obliquely rounded, pale-yellowish, with reticulated grey markings; base of costa grey; a median grey line from base to one-third, joined by two lines from costa at one-fourth and before middle, and two from inner-margin at one-fourth and middle; an inwardly oblique line from costa near apex to middle of inner-margin, connected with costa at two-thirds; a fine irregularly-dentate line arising with preceding to inner-margin before anal angle; a dot in disc at two-thirds; cilia yellowish. Hindwings and cilia whitish.

The type is somewhat worn.

Cairns, Queensland; one specimen taken by Mr. C. J. Wild in July. (Queensland Museum).

Termessa diplographa, *n. sp.*

Female, 22 mm. Head whitish; vertex and collar yellowish. Palpi ochreous. Antennæ fuscous. Thorax ochreous-yellow, anterior-margin blackish. Abdomen (broken). Legs ochreous; anterior tibiæ and tarsi obscurely annulated with fuscous. Forewings elongate-triangular, costa gently arched, apex obtuse, hindmargin rather oblique, scarcely rounded; light ochreous-yellow, with dark-fuscous markings; a broad line from costa at one-fifth, angulated beneath costa to inner-margin at one-fourth; a second line from costa at two-fifths to beyond middle of inner-margin, slightly wavy in disc; a third line from costa at two-thirds to anal angle, somewhat dilated on costa; a fine line parallel to third from just beyond anal angle, angulated outwards in disc at three-fourths, and ceasing abruptly; disc between third and fourth lines partly suffused with fuscous; a large triangular spot on hindmargin immediately beneath apex; cilia ochreous-yellow, on hindmarginal spot and at anal angle fuscous. Hindwings light-ochreous-yellow; a broad fuscous band from costa near hindmargin, dilated in middle, narrowing to a point at anal angle; cilia pale-ochreous-yellow, with a small fuscous spot below apex.

Smaller than the other species of the genus. Distinguished from *T. gratiosa*, Walk., by the yellower forewings, with both fasciæ completely resolved into two separate lines.

Brisbane; one specimen.

Eurodes, *n. g.*

Tongue well-developed. Palpi small, protected, terminal joint short, obtuse. Antennæ in male (unknown). Forewings with vein 2 from two-fifths, 3 from near angle, 4 and 5 stalked, 6 and 7 stalked, 11 connected by a bar with 12. Hindwings with 3 and 4 stalked, 5 absent, 6 and 7 stalked, 8 from near angle of cell.

Among Australian genera this appears to stand isolated. The separate condition of veins 8, 9, and 10 of forewing is noteworthy.

Eurodes micrommata, *n. sp.*

Female, 17 mm. Head and thorax fuscous-grey. Abdomen whitish-ochreous, Legs pale ochreous. Forewings oblong, strongly dilated, costa strongly arched in basal half, thence nearly straight; apex obtuse, hindmargin straight, rounded beneath, not oblique; fuscous-grey, mixed with pale ochreous; apical two-fifths of costa ochreous; three blackish lines: first wavy from costa at one-third to inner margin at two-fifths; second from costa at three-fifths to middle of hindmargin, and continued along margin to anal angle; third from costa at four-fifths, joining second line; a minute orange spot in disc at two-thirds; cilia grey, mixed with blackish. Hindwings and cilia whitish-ochreous

Port Darwin, North Australia; one specimen. (Coll. Lyell).

PHANEROPSEUSTIS, *Meyr.* (MSS.).

Head with projecting scales above. Tongue well developed. Antennæ of male filiform, shortly ciliated (one-half to one). Palpi short, appressed, loosely scaled; terminal joint short, obtuse. Forewings with two from three-fifths, three from four-fifths, seven and eight stalked, eight and nine stalked, ten absent, twelve giving off three short branches to costa. Hindwings six and seven long-stalked, eight from four-fifths.

Characterised especially by the curious branching of vein twelve of forewings.

Phaneropseustis albida, *Walk.*

Nudaria albida, Walker, Brit. Mus. Cat., Suppl., 273; Lucas; Proc. Linn. Soc., N.S.W., 1893.

Male and female, 16-19 mm. Head, palpi, antennæ, thorax, and abdomen white. Legs white; anterior tibiæ and tarsi fuscous-tinged. Forewings oblong, posteriorly dilated, costa strongly arched, apex rounded, hindmargin obliquely rounded;

white, thinly-scaled; markings pale-fuscous; a blackish dot in disc before middle, and a second beyond middle; two fine interrupted lines from costa at one-fifth and before middle, ending in rather conspicuous dots on inner-margin, which are sometimes confluent; a third line from costa at two-thirds to before anal angle, sometimes obsolete; a fourth line from costa before apex to hindmargin above anal angle, also sometimes obsolete; a series of dots along hindmargin; cilia white. Hindwings and cilia white.

Brisbane; in September.

PHANEROPSEUSTIS OBDUCTA, *Luc.*

Nudaria obducta, Lucas, Proc. Linn. Soc., N.S.W., 1893.

Male, 18 mm. Head pale-fuscous; face and palpi whitish. Antennæ whitish. Thorax pale-fuscous, irrorated with whitish scales. Abdomen white. Legs white; anterior pair fuscous-tinged. Forewings oblong, not dilated, costa strongly arched at base, thence slightly, apex rounded, hindmargin obliquely rounded; whitish; irrorated with fuscous scales; all margins narrowly edged with fuscous; interrupted fuscous streaks along veins in disc, and terminations of veins on hindmargin; a dot in disc at two-thirds; an ill-defined whitish fascia at one-third; a whitish area along hindmargin, bounded anteriorly by a well-defined dentate line from costa at two-thirds obliquely outwards, then bent parallel to hindmargin, ending in inner-margin at three-fourths; indications of a fine line posterior and parallel to this; cilia pale-fuscous, apices whitish. Hindwings and cilia whitish.

Brisbane.

PSILOPEPLA, *n. g.*

Tongue present. Antennæ, basal joint clothed with long hairs, forming an anterior tuft; in male filiform, with short, fine ciliations (two-thirds). Palpi minute. Forewings clothed with fine hair-like scales; vein two from near middle, three from five-sixths, five absent, eight and nine out of seven, ten running into nine, eleven anastomosing with twelve. Hindwings six and seven long-stalked, eight from two-fifths.

A peculiar genus, but probably allied to *Phaneropseustis*, Meyr.

PSILOPEPLA MOLLIS, *Luc.*

Nudaria mollis, Lucas, Proc. Linn. Soc., N.S.W., 1893.

Male, 14 mm. Head whitish, suffused above with pale-fuscous. Antennæ whitish. Thorax whitish, suffused with pale-fuscous. Abdomen whitish. Legs whitish; anterior tibiæ pale-fuscous. Forewings strongly dilated posteriorly, costa moderately arched, apex rounded, hindmargin oblique, scarcely rounded; whitish,

thinly scaled; costal edge pale-fuscous at base, a pale fuscous dot in disc near base, and another on inner-margin near base, the whole connected by a pale-ochreous suffusion; a pale-fuscous dot on costa at one-third, connected by a pale ochreous suffusion, with a pale-fuscous line to inner-margin at one-fourth; a circular fuscous spot above middle of disc; a pale-fuscous dot on costa at two-thirds, connected by a pale-ochreous suffusion with a pale-fuscous line, which describes a strongly sigmoid curve before ending in anal angle; a very pale fuscous line towards hindmargin, darker above anal angle; cilia whitish, above anal angle fuscous. Hindwings and cilia whitish.

A delicate and prettily-marked species.

Brisbane.

SCAPHIDRIOTIS, *Meyr.* (MSS.).

Tongue well developed. Antennæ in male finely and evenly ciliated (one and a-half), with a dense tuft of scales on upper surface immediately beyond basal joint. Palpi moderate, second joint clothed with very long loose hairs, terminal joint short, obtuse. Thorax with a posterior crest. Forewings with inner-margin strongly folded over beneath; vein two from two-thirds, five absent, eight and nine out of seven. Hindwings with a dense patch of scales on upper surface; vein five absent, six and seven long-stalked, eight from one-fourth.

SCAPHIDRIOTIS XYLOGRAMMA, *Meyr.* (MSS.).

Male, 16-17 mm. Head and palpi fuscous. Antennæ whitish, brownish tinged; tuft whitish, but portion from which tuft arises fuscous. Thorax fuscous; crest whitish; apex of patagia dark-fuscous. Abdomen fuscous; tuft whitish. Legs whitish; anterior pair infuscated. Forewings very elongate-triangular, costa slightly arched, apex rounded, hindmargin obliquely rounded; whitish, thickly irrorated with brownish-fuscous scales, which form more or less distinct markings; a line from one-fourth of costa to one-third of inner-margin, sometimes obsolete; a sharply-dentate line from costa at three-fifths to before anal angle; a dark spot below middle of disc touching this line; series of dark spots along apical-third of costa and hindmargin; cilia whitish, on spots bases brownish-fuscous. Hindwings whitish-brown; with a densely scaled brownish-fuscous patch above middle; cilia whitish.

Brisbane; four specimens.

PSAPHARACIS, *n. g.*

Tongue well developed. Antennæ in male (unknown). Palpi moderate, slender, ascending; terminal joint moderate, tolerably acute. Forewings with costa very strongly arched, hindmargin

excavated; vein two from five-sixths, eight and nine out of seven. Hindwings with three and four stalked, five absent, six and seven stalked, eight from one-third.

PSAPHARACIS TOXOPHORA, *n. sp.*

Female, 19 mm. Head pale fuscous. Palpi dark-fuscous. Antennæ brown-whitish. Thorax brown-whitish. Abdomen grey. Legs ochreous-whitish; anterior pair fuscous. Forewings trapezoidal, strongly dilated beyond middle, costa at first straight, very strongly arched beyond middle and crested on convexity, apex acute, hindmargin excavated beneath apex, hence obliquely rounded; brown whitish, paler towards hindmargin; an ill-defined whitish streak along costa to two-thirds; dark-fuscous dots on costa at one-fifth, beyond two-fifths, three-fifths, and four others in apical third; from second costal dot an indistinct, very slender, much angulated, transverse line to inner-margin at two-fifths; from third dot a very slender line parallel to costa, abruptly bent beneath costa at five-sixths, and continued much angulated to before anal angle, where it forms a conspicuous dark-fuscous spot; a transversely oval whitish spot above middle of disc at three-fifths; cilia brown-whitish, mixed with dark-fuscous. Hindwings and cilia grey.

Brisbane; one specimen taken by Mr. F. P. Dodd.

SOROCOSTIA CERRAUNIAS, *n. sp.*

Male, 15 mm. Head whitish. Palpi (2), white irrorated with grey. Antennæ grey. Thorax whitish-grey. Abdomen grey. Legs fuscous; posterior pair whitish. Forewings elongate, posteriorly dilated, costa moderately arched, apex round-pointed, hindmargin very obliquely rounded; whitish-grey, sparsely scattered with blackish scales; first and second tufts blackish anteriorly; a narrow blackish line, outwardly curved, from costa at one-fourth to inner-margin at one-fourth; a second similar line, somewhat angulated, inwardly oblique, from costa at three-fourths to inner-margin at three-fourths; cilia grey. Hindwings and cilia whitish.

In Meyrick's table falls with *S. paroxynta*, Meyr., from which it is distinguished by the shorter palpi, blackish tufts on forewings, and other points. Examples of this and the two following species were submitted to Mr. Meyrick, who pronounced them new.

Sydney; two specimens in February.

SOROCOSTIA DESMOTES, *n. sp.*

Male and female, 12-15 mm. Head, thorax, and antennæ pale-brownish, or whitish, irrorated with brownish scales. Palpi (2), fuscous-brown. Abdomen whitish-grey. Legs fuscous,

irrorated with whitish. Forewings elongate-triangular, costa slightly arched, apex round-pointed, hindmargin scarcely rounded, rather strongly oblique; whitish, irrorated with pale-brownish and dark-fuscous scales; three suffused fuscous spots on costa at base, one-third, and middle; from the second of these proceeds an angulated, suffused line to inner-margin at one-third; a slightly sigmoid line of dark-fuscous dots from costa at three-fourths to before anal angle; cilia brownish, with a whitish basal line. Hindwings and cilia whitish-grey.

In Meyrick's table falls with *S. parallacta*, Meyr., from which it is distinguished by the much shorter palpi, brownish coloration, and dark-fuscous spots on costa.

Brisbane; in September, and again in January and February, rather common, but seldom taken in good condition.

Sorocostia microphila, *n. sp.*

Female, 11-13 mm. Head and thorax white, irrorated with blackish scales. Antennæ white, annulated with blackish. Palpi one and a half, dark-fuscous. Abdomen grey. Legs dark-fuscous, irrorated with white. Forewings elongate, posteriorly dilated, costa slightly arched, apex round-pointed, hindmargin very obliquely rounded; white, faintly ochreous-tinged, irrorated with blackish scales; tufts posteriorly white, anteriorly mixed with fuscous; anterior line very inwardly oblique, from costa at one-fourth to inner-margin at one-fifth; posterior line obsolete on costa, though otherwise conspicuous, from beneath costa at two-thirds, strongly angulated outwards, then inwardly oblique to inner-margin beyond middle; a blackish dot in disc before apex; and a series of black dots along hindmargin; cilia grey, irrorated with blackish, tips whitish. Hindwings and cilia grey.

In Meyrick's table falls with *S. epicentra*, Meyr., from which it may be distinguished by its much smaller size and different form of transverse lines.

Brisbane; three specimens.

Uraba leucospila, *n. sp.*

Male, 16 mm.; female, 22 mm. Head white. Palpi fuscous. Antennæ whitish. Thorax white; with some fuscous scales. Abdomen grey. Legs fuscous, mixed with whitish. Forewings triangular, costa moderately arched, apex obtuse, hindmargin almost straight, rather oblique; fuscous (in female pale-fuscous), with some scattered white scales; a triangular white blotch on inner-margin from base to beyond middle, not reaching above middle of disc; two fine fuscous lines, much angulated, first from costa at two-fifths to inner-margin forming outer edge of white blotch, second from costa at three-fifths to inner-margin before

anal angle ; first line edged anteriorly with white ; second edged posteriorly with white, rather broadly in costal portion ; space between two lines suffused with brassy-metallic scales, and with dark-fuscous forming an indistinct median streak ; three or four minute white dots on apical two-fifths of costa ; from the second of these a very fine wavy white line proceeds to anal angle : cilia pale-fuscous. Hindwings and cilia dark-grey ; paler in female.

Closely allied to *Uraba metallopa*, Meyr., from which it may be distinguished by the absence of basal costal metallic spot, by the sharply-defined white blotch, which does not extend to costa, and by the more angulated transverse lines. The male is much smaller and darker than the female.

Brisbane ; two specimens.

SARROTHRIPA POLYCYMA, *n. sp.*

Male and female, 17-22 mm. Head and palpi dark-fuscous, irrorated with white scales. Antennæ fuscous, basal joint irrorated with white. Thorax white, irrorated with dark-fuscous. Abdomen grey. Legs white, irrorated with dark-fuscous. Forewings elongate-oblong, posteriorly dilated, costa slightly arched, apex rounded, hindmargin obliquely rounded ; white, thickly irrorated with grey ; with six slender, much angulated, blackish transverse lines ; first and second parallel, from costa about one-fifth, becoming lost in disc ; third and fourth parallel, from costa about two-fifths, to inner-margin about middle ; fifth and sixth parallel, describing a sigmoid curve, from costa at four-fifths to inner-margin before anal angle; one or two blackish dots on costa before apex ; two indistinct whitish lines parallel to hindmargin ; a blackish line, tending to be interrupted, along hindmargin ; cilia grey, mixed with white scales. Hindwings white ; at apex and along hindmargin dark-grey ; cilia white, basal half grey at apex.

Distinguished from *S. exophila*, Meyr., by the absence of greenish scales, the white hindwings, and other details.

Brisbane : four specimens from January to April.

THRYPTICODES, *Meyr.* (MSS).

Tongue well-developed. Antennæ in male with very short ciliations (one-eighth), and a small tuft of hairs on upper surface near base (absent in female). Palpi rather long (two), with appressed scales, ascending ; terminal joint long, obtuse. Thorax crested posteriorly. Anterior tibiæ densely tufted with long hairs beneath, especially in male. Forewings with vein two from two-thirds, eight and nine out of seven by a common stalk, ten out of seven. Hindwings in male with a pencil of long hairs

arising from upper aspect of costa (absent in female); three, four, and five from a common stalk, eight from middle.

Allied to *Sarrothripa*, Curt.

THRYPTICODES XYLOGLYPTA, *Meyr.*

Thrypticodes xyloglypta, (Meyr., MSS.), Lucas, Proc. Linn. Soc., N.S.W., 1889.

The markings of forewings are variable, usually darker in the female.

Brisbane; in December, January, and February.

MOSODA HEMICHROA, *n. sp.*

Female, 20 mm. Head and thorax fuscous, irrorated with whitish. Palpi and antennæ fuscous. Abdomen ochreous; tuft dark-fuscous. Legs fuscous; posterior tibiæ ochreous-whitish. Forewings elongate-triangular, costa slightly arched, apex rounded, hindmargin obliquely rounded; fuscous thickly irrorated with whitish scales—the absence of these gives rise to the following markings:—An indistinct transverse line near base, a wavy transverse line from costa at one-third to inner-margin before middle, a third wavy line from costa at two-thirds obliquely outwards, then sharply bent in disc parallel to hindmargin, then bent again inwards to before anal angle; a faint circular spot with paler centre between two of these lines above middle of disc; cilia whitish, basal two-thirds barred with fuscous. Hindwings pale-orange-ochreous; a faint fuscous line parallel to hindmargin at three-fourths; a fuscous spot at apex; cilia pale-ochreous, bases fuscous, except towards anal angle.

Gisborne, Victoria; two specimens taken in November, received from Mr. G. Lyell.

SCAEODORA PLACOCHRYSA, *n. sp.*

Male, 15 mm. Head golden-yellow. Palpi dark-fuscous. Antennæ ochreous-fuscous, in male somewhat serrate. Thorax dark-fuscous; anterior margin and a posterior spot golden-yellow. Abdomen blackish; base and tuft golden-yellow. Legs golden-yellow; anterior and middle tibiæ broadly fuscous at apex. Forewings elongate, posteriorly dilated, costa nearly straight, except posterior one-fourth, which is moderately arched; apex rounded, hindmargin obliquely rounded; dark-fuscous, markings golden-yellow; a very broad transverse fascia near base; a large triangular spot on costa beyond middle, nearly meeting a similar spot on inner-margin beyond middle; a small spot on hindmargin above anal angle; cilia yellow, at anal angle, and middle of hindmargin mixed with fuscous. Hindwings dark-fuscous; basal half golden-yellow; cilia dark-fuscous.

Cairns, Queensland; one specimen taken by Mr. C. J. Wild in January. (Queensland Museum)

GONIOSEMA, *n. g.*

Tongue well developed. Antennæ in male bipectinated. Palpi moderate, loosely scaled, somewhat ascending; terminal joint moderate, pointed. Forewings with two from four-fifths, three and four stalked, five absent, eight and nine out of seven, ten absent. Hindwings with three and four stalked, six and seven stalked, eight from middle.

A development of *Chiriphe*, differing in the pectinated antennæ and absence of vein five of forewings.

GONIOSEMA ANGULISCRIPTA, *Luc.*

Chiriphe anguliscripta, Lucas, Proc. Linn. Soc., N.S.W., 1889.

THALLARCHA RHABDOPHORA, *n. sp.*

Male, 17 mm. Head, thorax, and antennæ blackish-fuscous. Abdomen dark-fuscous; tuft and inferior surface golden-yellow. Legs dark-fuscous. Forewings golden-yellow; base dark-fuscous; a broad longitudinal dark-fuscous bar from base to hindmargin, where it joins a broad dark-fuscous band along hindmargin; cilia dark-fuscous. Hindwings golden-yellow; with a broad dark-fuscous hindmarginal band.

An exceptionally distinct species.

New South Wales (?); one specimen. (Coll. Lyell).

THALLARCHA LEPTOGRAPHA, *n. sp.*

Male, 15-16 mm. Head white; face fuscous. Palpi whitish; apical joint fuscous. Antennæ grey; basal joints white. Thorax dark-fuscous; collar, apex of patagia, and a posterior spot white. Abdomen whitish-grey. Legs whitish; anterior pair infuscated. Forewings elongate, posteriorly dilated, costa slightly arched, more strongly at base and apex, apex obtuse, hindmargin obliquely rounded; whitish, markings fuscous; base of costa dark-fuscous; a fine interrupted line, sharply angulated outwards in disc, from costa at one-fourth to inner-margin at one-fourth; two fine parallel wavy lines from costa before middle to inner-margin beyond middle; traces of a fourth parallel line posterior to these; a fifth line from costa at three-fourths to before anal angle; a triangular spot on costa before apex; an incomplete sixth line, and some suffusion along hindmargin; cilia whitish, mixed with fuscous. Hindwings and cilia whitish-grey.

Brisbane; two specimens.

COMARCHIS COSMIA, *n. sp.*

Female, 18 mm. Head ochreous-yellow. Palpi dark-fuscous. Antennæ ochreous-whitish. Thorax blackish-fuscous; collar, an anterior spot, and apex of patagia ochreous-yellow. Abdomen dark-fuscous; three apical segments pale-ochreous. Legs ochreous-

yellow; anterior pair infuscated. Forewings elongate, costa moderately arched, apex obtuse, hindmargin oblique, slightly rounded; ochreous-yellow, markings dark-fuscous; a broad oblique fascia from costa at two-fifths to inner-margin beyond middle, tolerably straight and even-margined, somewhat narrowing towards inner-margin; a second fascia from costa at three-fourths to anal angle, narrow on costa, broadening in disc, interrupted above anal angle; a large irregular blotch on costa before apex, its lower angle touching hindmargin; cilia ochreous-yellow, fuscous where subapical blotch reaches margin. Hindwing ochreous-yellow; a well-defined oval dark-fuscous spot in disc at two-thirds; two large suffused-fuscous spots on hindmargin at apex and before anal angle; cilia ochreous-yellow, on spots fuscous.

Brisbane; one specimen at light in October.

Comarchis chionea, *n. sp.*

Female, 20 mm. Head snow-white. Palpi blackish. Antennæ, basal joint white, then blackish, apical three-fourths grey. Thorax blackish; collar, a large anterior spot, a small posterior spot, and apex of patagia snow-white. Abdomen ochreous-yellow. Legs fuscous; posterior pair ochreous yellow. Forewings elongate, scarcely dilated, costa slightly arched, apex rounded, hindmargin obliquely rounded; snow-white, markings dark-fuscous; base of costa blackish; a broad transverse fascia from costa before middle to inner-margin beyond middle, bifurcating below to enclose a white spot on inner-margin, posterior limit of this fascia is paler-fuscous; a dot on costa at three-fourths, tending to be connected with a large spot in disc, containing a few white scales, and connected by a fine line with anal angle; a large spot on costa before apex, confluent with upper portion of discal spot, connected by a line, parallel to that just mentioned, with anal angle; an oblong spot on hindmargin beneath apex; and a few scattered blackish scales on hindmargin; cilia pale-ochreous, on markings dark-fuscous, at apex white. Hindwings ochreous-yellow; a faint fuscous dot in disc (better marked on under surface), a small fuscous spot at apex; cilia ochreous-yellow, beneath apex fuscous.

Sydney; one specimen taken in February on the fence of the Botanical Gardens during a gale.

Comarchis mochlina, *n. sp.*

Male, 17 mm. Head and antennæ ochreous-whitish. Palpi ochreous-fuscous. Thorax ochreous-whitish, with a fuscous band across middle. Abdomen whitish-ochreous. Legs whitish-ochreous; anterior pair infuscated. Forewings elongate, posteriorly

dilated, costa slightly arched, more strongly towards apex, apex round-pointed, hindmargin obliquely-rounded ; whitish, markings dark fuscous ; a broad transverse fascia from costa at two-fifths to inner-margin beyond middle, broadest on costa, narrowing towards inner-margin ; a second broad, slightly wavy fascia from costa at four-fifths to anal angle ; an elongated spot along upper fourth of hindmargin reaching to apex ; cilia whitish, below apex and above anal angle fuscous. Hindwings whitish, with an apical fuscous spot ; cilia whitish, beneath apex fuscous.

Brisbane ; one specimen taken at light in April by Mr. C. J. Wild. (Queensland Museum.)

ERRATA

In my former paper in vol. XXII. of these Transactions.

Pp. 200, 201, for *Hyponomenta* read *Hyponomeuta ;* for *paurocentera* read *paurocentra.*
P. 202, for *Simæthis* read *Simaëthis.*
P. 203, for *Chorentis* read *Choreutis.*
P. 207, for *beliodora* read *heliodora.*
P. 211, for *coniætia* read *coniortia.*

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read May 2, 1899.]

XXV.

STAPHYLINIDÆ.

PÆDERUS.

The following two new species belong to the same section of the genus as *australis*, Guér., differing from *Simsoni*, Blackb., *Meyricki*, Blackb., and *sparsus*, Fauv., by their well developed parallel elytra, and from *cruenticollis*, Germ., by their subfiliform and comparatively slender antennæ. They all differ from *australis inter alia* in not having in combination black legs and testaceous mandibles; from *Adelaidæ*, Blackb., by much smaller size, apical ventral segments black, &c. As there are now, including these two, nine known species of *Pæderus* from Australia it is perhaps desirable that a statement of their distinctive characters should be given in tabular form as follows:

A. Apterous species, with the elytra very narrow at the base; eyes very small.
  B. Elytra closely punctulate.
    C. Prothorax with strongly rounded sides,—almost subglobular ... ... *Meyricki*, Blackb.
    CC. Prothorax much more elongate in form, its sides not much rounded ... ... *Simsoni*, Blackb.
  BB. Elytra sparsely punctulate .. .. *sparsus*, Fauv.
AA. Winged species; elytra normal* (if otherwise,—the eyes not particularly small).
  B. Hind body entirely rufo-testaceous ... ... *Adelaidæ*, Blackb.
  BB. Hind body with some or all of the segments of dark colour (piceous or black).
    C. Antennæ long, robust, and apically dilated ... *cruenticollis*, Germ.
    CC. Antennæ notably more filiform and slender.
      D. Mandibles testaceous.
        E. Legs black ... ... *australis*, Guér.
        EE. Femora (except at apex) testaceous ... *tweedensis*, Blackb.
      DD. Mandibles black.
        E. Apical part of antennæ dark ... ... *angulicollis*, Macl.
        EE. Apical part of antennæ testaceous ... *Koebeli*, Blackb.

P. tweedensis, sp. nov. Alatus; testaceus, capite (mandibulis palpisque testaceis exceptis) et segmentis ventralibus

* This provision is inserted on account of a statement of M. Fauvel that he has seen abnormal specimens of *P. cruenticollis*, Germ., which are apterous.

apicalibus 2 piceis vel nigris, elytris cœruleis, antennis (basi excepta) pedibusque (femorum parte basali excepta) plus minusve infuscatis; antennis modice elongatis, gracilibus, apicem versus vix incrassatis; oculis sat magnis (fere ut *P. australis*, Guér.); capite minus brevi minus lato; prothorace subovato, postice modice angustato, lateribus vix arcuatis, utrinque subtiliter parce punctulato; elytris quam prothorax sublongioribus, sat fortiter sat crebre (nullo modo confluenter) punctulatis; abdomine sat fortiter marginato, leviter minus crebre punctulato. Long., 3 l.

N.S. Wales; Tweed R. district (given to me by the late Mr. Olliff).

P. Koebelei, sp. nov. Alatus, fere ut præcedens *(P. tweedensis)* coloratus, sed mandibulis palpisque nigris, antennarum articulis apicalibus 2 pallide testaceis, femorum (basi summa excepta) infuscatis; antennis modice elongatis sat gracilibus; oculis parvis; capite modico, postice fortiter angustato; prothorace angusto quam latiori manifeste longiori, utrinque parce minus subtiliter punctulato, lateribus leviter arcuatis; elytris quam prothorax nullo modo longioribus, crebre sat grosse punctulatis; abdomine sat fortiter marginato, sparsim subfortiter punctulato. Long., $2\frac{4}{5}$ l.

The most conspicuous character of this species is the colouring of its antennæ which have their basal three joints testaceous, the fourth testaceous at the base only, joints five to nine nearly black; joints ten and eleven very pale whitish testaceous.

N. Queensland (given to me by Mr. Koebele).

P. tenuicornis, Fauv. There seems to be very little doubt that this is identical with *P. angulicollis*, Macl., of which I have examples from Mr. Lea compared with the type. Both species are attributed to Gayndah in Queensland, and the specimens Mr. Lea sent agree very well with the description of Fauvel's insect. Sir W. Macleay's is the older name.

P. cruenticollis, Germ. I have some specimens from W. Australia sent to me by Mr. Lea which I take to be the apterous form of this species referred to by M. Fauvel (Ann. Mus. Gen., 1878, p. 516). They differ from all the other apterous Australian *Paederi* known to me *inter alia* by their larger eyes.

PHALACRIDÆ.

I have recently received for determination a minute beetle (appertaining to this family) which was taken by Mr. Mitchell, the Overseer of the Queensland Acclimatising Society, and which that gentleman believes to prey upon the Pink Scale (*Ceroplastes rubra*). I am not acquainted with the life history of any *Phalacrid*, and therefore abstain from expressing an opinion as

to the probability of the beetle being parasitic on the scale beyond saying that I have never myself observed any such habit in the *Phalacridæ*. M. Lacordaire (Gen Col.) stated that he knew nothing of the life history of the family, and I do not find any reference to the subject in any of those I have seen of the (comparatively recent) works of M. Guillebeau on these beetles. I therefore leave the matter to those who devote their attention to the life history of the *Coleoptera*.

The species in question is an undescribed one and belongs to (or at any rate is near) M. Guillebeau's genus *Parasemus*, which I cannot ascertain to have been diagnosed except so far as its characters are indicated in a tabulation of certain genera of *Phalacridæ* (Ann. Soc. Ent. Fr., 1894, pp. 280 and 281): and unfortunately the value of the tabulation is diminished by its containing a line "2a" without any corresponding "2b." In a former paper on the *Phalacridæ* (Tr. R.S., S.A., 1895, pp. 205, &c.) I mentioned the difficulty of identifying *Parasemus*, but referred to that genus provisionally certain Australian *Phalacridæ* whose structure shows them to be at least nearly allied to it. The insect described below is certainly congeneric with (at least some of) them and therefore I place it provisionally in *Parasemus*.

PARASEMUS ?

P. Mitchelli, sp. nov. Sat late ovalis; nitidus; nigro-piceus (exemplis nonnullis pallidioribus), præsertim versus latera, antennis pedibus et corpore subtus plus minusve brunneo-testaceis; corpore supra fere lævi; antennarum clava 3-articulata; scutello sat parvo; elytrorum stria subsuturali postice sat fortiter impressa; femoribus posticis sat fortiter, tibiis minus fortiter (ambobus quam *P. victoriensis*, Blackb. multo minus fortiter) compressis; tarsis posticis quam anteriores 4 modice longioribus, articulo basali quam 2us breviori; coxis intermediis inter se sat remotis; mesosterno vix perspicuo; clypeo prope oculos manifeste emarginato, antice rotundato; prosterno pone coxas anticas haud producto. Long. $\frac{3}{5}$ l.; lat. $\frac{2}{5}$ l.

The very small size of this insect together with the absence of discal rows of elytral punctures renders it easy to recognise. It is near *P. obsoletus*, Blackb., structurally. The second joint of the hind tarsi is longer than the first, but not so much as twice its length. All the tarsi are comparatively short and stout, those of the hind legs being decidedly but not very much longer than the rest. In my tabulation of the species I attribute provisionally to *Parasemus* (Tr. R.S., S.A., 1895, p. 214), *P.* (?) *Mitchelli* will follow *discoideus*, Blackb., thus—

EEE. Elytra without discal rows of punctures. *Mitchelli*, Blackb. Queensland.

B. Terræ-reginæ, sp. nov. Ferrugineum vel picescens; sat nitidum; subtus hirsutum; capite antice crebre subtilius granulatim, inter oculos rugulose magis grosse, postice sparsissime sat fortiter, punctulato; prothorace crebrius perspicue sat æqualiter subtiliter punctulato, puncturis grossis (his in parte media et in maris parte declivi sparsis vel fere carentibus) creberrime fere confluenter intermixtis; scutello sparsim vel obsoletius punctulato; elytris striatis, striis punctulatis (his et puncturis postice obsoletis), interstitiis sat planis; tibiis anticis extus fortiter 7-dentatis.

Maris clypeo (ut *B. proboscidei*, Schreibers) longe ultra mandibulis productis, parte producta antrorsum sinuatim gradatim angustata et ad basin lamina (hac valde elevata superne bifida) armata; prothorace antice abrupte declivi, spatio ante declivitatem sat lato planato subsemicirculari.

Feminæ clypeo haud producto antice fortiter rotundato, ad basin lamina (hac leviter elevata superne bifida) armato; prothorace antice anguste minus abrupte declivi, ante declivitatem spatio plano angusto. Long., 9—10 l.; lat., 5—5½ l.

This species is distinguished from the other described Australian species of *Bolboceras* except *proboscideum*, Schreibers, by the clypeus being produced like a rostrum far beyond the part where on the underside the mandibles are inserted. It differs from *proboscideum* in the elytral interstices being evidently flatter, and the punctulate striæ of the elytra becoming much more notably obsolete near the apex. The male differs from that of *proboscideum inter alia* in the produced part of the clypeus being not in the least downward directed at the apex and in the erect lamina at the base of the clypeus being about equal in height to the length of the clypeus in front of it,—so that looked at from the side the head (in front of the eyes) appears as a quadrate rostrum about equal in length and height with its front face deeply and roundly emarginate. This same part from the same point of view also bears a considerable resemblance in outline to the head of a fish with its mouth widely open. The prothorax of the male differs from that of *proboscideum* in there being in front of the vertical declivity a nitid almost lævigate space whose plane is at a right angle to the plane of the declivity and which is marked off from the declivity by a very strong furrow; while the corresponding part in *proboscideum* is very much more punctured, is itself notably declivous (though less strongly so than the part immediately behind it) and is not separated from the part behind it by a defined furrow.

The female of this insect is very close to that of *proboscideum*, differing however in the very much more obsolete sculpture of the hind part of its elytra, in the more strongly rounded front margin of its clypeus and in its prothorax having a flat nitid space (similar to, but very much smaller than, that of the male) in front of the anterior declivity.

B. proboscideum is so extremely variable an insect that it is just possible that the present species is an extreme local variety of it, but in a long series of the former I do not find a single specimen presenting any of the characters mentioned above as distinctive of *B. Terræ-reginæ*.

Queensland; given to me by Mr. Koebele; also from Mr. Lea (Brisbane).

ANODONTONYX.

A. planiceps, Blackb. I am informed by Mr. Jüng of Yorke's Peninsula that the larva of this species is extremely injurious to wheat in his neighbourhood, eating the roots and so killing the plants.

ISODON.

I. nasutus, Blackb. I have recently examined several female specimens (from W. Australia) of an *Isodon* in the collection of Mr. Jüng which I have no doubt appertain to this species. They differ from the (male) type in the prothoracic excavation being reduced to a very small area (immediately behind the front margin of the segment) which is declivous and flattened rather than distinctly concave; in the seriate (and confused lateral) punctures of the elytra being more defined,—though very much feebler than in any other W. Australian *Isodon* known to me; and in the pygidium being much more gibbous, with its punctuation much closer so as to render the surface somewhat opaque. I should have no hesitation in identifying this insect with *I. lævigatus*, Burm., were it not for Burmeister's statement that in that species the clypeus is not produced in front (ohne vorsprung); whereas in *I. nasutus* the clypeus is particularly strongly produced in front. I have, however, seen so many specimens from W. Australia of this genus without finding one to agree with Burmeister's description of *lævigatus* that I am suspicious of a mistake in the description,—the clypeus having possibly been broken in the type.

I. curtus, Burm. At the time when I tabulated the species of *Isodon* (Tr.R.S., S.A., 1896, p. 237) I had not seen this one, but have since received it from several collectors. It would stand in my tabulation (*loc. cit.*) beside *I. Australasiæ*, Hope, from which it differs *inter alia* by its clypeus much narrower in front, its prothorax and pygidium very much more finely punctulate, its head with a transverse carina in place of a tubercle, and its much smaller size. The elytral sculpture does not differ much.

I. laticollis, Burm. This is another species that I had not seen when I tabulated *Isodon* (*loc. cit.*). I have since received an example from W. Australia which differs from *I. curtus* as *I. laticollis* is said to do ; its clypeus is a trifle less narrowed in front, its prothorax evidently more massive and less narrowed anteriorly and its elytra are more regularly punctured and striate than those of an average *curtus ;* nevertheless I hesitate to regard it as more than a variety of *curtus*, inasmuch as the differences are all of them comparatively slight and pertain to characters (the prothoracic development of the male and the linear arrangement of the elytral sculpture) in which the *Dynastides* are frequently inconstant ; in respect of the latter character *I. curtus* is certainly variable, as also in size.

ANOPLOGNATHUS.

A. Macleayi, Blackb. I have recently received from Mr. Jüng examples of this species which enable me to improve my description (P. L. S., N.S.W., 1891, p. 495) as it is clear that the type was either a colour var. or (more probably) a specimen that had been discoloured in some artificial manner. Fresh specimens are of a uniform pale opalescent testaceous colour both above and beneath, except the legs which have a greenish gloss in certain lights, and the abdomen and pygidium which are coppery but edged (and more or less suffused) with metallic green.

ORYCTES.

O. Barbarossa, Fab. I have lately received from Mr. Price Maurice a remarkably fine and large example of this species taken by Mr. Maurice during one of his explorations in Northern Australia. The specimen is accompanied by two larvæ which are said to be (and evidently are) the larvæ of *O. Barbarossa.* As there does not appear to be any published description of the latter the following record of characters will be of interest : Long. 3½ inches ; of the usual *Lamellicorn* type (*i.e.*, with three pairs of legs placed on the anterior three segments, and the apical segments greatly dilated) ; colour piceous ; each dorsal segment thickly studded with granules bearing each a short stiff bristle and also thinly set with long fine hairs (the granules and long hairs however becoming very sparse on the dilated apical four segments, but becoming close again on the apical part of the last segment) ; ventral segments (except the apical and hind part of the penultimate) devoid of setiferous granules but thinly clothed with long fine hairs. Head comparatively small, closely and very rugulosely punctulate ; mandibles tridentate, very powerful, transversely strigose beneath ; the anterior seven dorsal segments with very strong transverse sulci.

BUPRESTIDÆ.

DIADOXUS.

D. Jüngi, sp. nov. Parvus; postice sat dilatatus; supra niger, capite (basi excepta) viridi, prothoracis lateribus et disco (his longitudinaliter) et elytrorum maculis discoidalibus quaternis vittaque laterali antica testaceo-viribus; subtus pedibusque [abdominis segmentis 2° ad apicem 3°-5° que totis (maculis quaternis flavis exceptis) rufis, tarsisque picescentibus, exceptis] viridibus; capite rugulose punctulato; prothorace leviter transverso, sparsius punctulato; elytris leviter striatis, striis punctulatis, interstitiis planis, apice acuminato; segmento ventrali apicali ad latera angulata (parte intermedia late leviter emarginata) vel ad latera vix angulata (parte intermedia subbisinuata); antennis nigris. Long., $3\frac{1}{5}$-$3\frac{4}{5}$ l.; lat., $1\frac{1}{5}$-$1\frac{2}{5}$ l.

In colour and markings this species does not differ much from *D. erythrurus*, White, but it presents several structural distinctions which certainly appear to be specific. It is very much smaller and considerably less narrow in proportion to its length, and its prothorax is shorter being by measurement distinctly wider than long. I was at first disposed to think it the male of *D. erythrurus* and the latter the female, but on careful examination I am satisfied that I have before me both sexes of both species. In *erythrurus* the apical ventral segment is trispinose in both sexes, the middle spine in the male (?), however, being reduced to little more than a strong angulation of the outline; while in the present insect the apical ventral segment is angular at its lateral margins (with the intermediate space feebly emarginate in outline) in one sex, and scarcely angular laterally (with the intermediate space feebly bisinuate) in the other sex. Mr. Jüng informs me that the present insect and *D. erythrurus* feed on different plants.

S.A., taken by Mr. Jüng on Yorke's Peninsula.

CLERIDÆ.

NATALIS.

So many alterations have taken place in the genus *Natalis* since my former paper on it was published (Tr. Roy. Soc. S.A., 1890) that it seems now desirable to furnish an amended tabulation of the species,—more particularly as the numerous specimens of the genus that I have examined have led me to the conclusion that some of the characters made use of in the former tabulation were not well chosen. In the following notes some remarks on those characters will be found as well as on the original descriptions of some of the species. It unfortunately is

not possible for me to place *N. Blackburni*, Waterh., in the following tabulation, as I have not seen any insect that I can identify with it and the description does not happen to mention the characters that I rely upon for purposes of tabulation. The species of *Natalis* are for the most part closely allied *inter se*, and unfortunately I cannot find any external sexual character sufficiently conspicuous and uniform to enable the sex of a specimen to be certainly determined at a glance. The most workable distinction of the sexes that I have been able to find consists in the hind tarsi in one sex (no doubt the male) being notably longer and more slender than in the other sex; the same sex moreover usually has a longer and narrower prothorax, the eyes a trifle less widely separated and (in most species) some peculiarity of sculpture in the ventral segments. There is also in the same sex a tendency to a lengthening of the third joint of the antennæ.

I may add that in 1893 M. Kuwert described a *Natalis* from N. Australia under the name *N. alternicostatus*. I have not seen the description, but should judge from the name that it is extremely unlikely to be any of the new species described in this paper.

The following tabulation contains, I believe, the names of all the described species of *Natalis* except *Blackburni*, Waterh., and *alternicostatus*, Kuwert.

*A. Disc of prothorax not closely and evenly punctulate.
  B. Size about 18 l. (elytra rounded at apex) ... *Titana*, Thoms.
  BB. Species not at the same time of great size and with elytra rounded at apex.
    C. Elytra mucronate at apex ... .. *spinicornis*, Blackb.
    CC. Elytra rounded at apex.
      D. All the elytral interstices evenly convex throughout .. .. *integra*, Blackb.
      DD. The elytral interstices not all conspicuously and evenly convex.
        E. The intermediate tibiæ straight or nearly so.
          F. Joints 9 and 10 of the antennæ quite strongly transverse ... ... *semicostata*, Blackb.
          FF. Joint 10 feebly, joint 9 not, transverse *lata*, Waterh.
        EE. The intermediate tibiæ quite strongly arched.
          F. Length of prothoracic sulcus not greater than distance from its apex to apex of prothorax.
            G. Elytra with numerous fascicles of short whitish hairs ... ... *Leai*, Blackb.
            GG. Elytra not variegated with whitish fascicles ... ... *lugubris*, Blackb.

* In *N. longicollis* the sculpture of the prothorax is intermediate between A and AA.

FF. Length of prothoracic sulcus evidently greater than distance from its apex to apex of prothorax.
G. Discal depression of prothorax punctured much less closely than in the following species ... ... *lævicollis*, Blackb.
GG. Discal depression of prothorax less sparingly punctulate.
H. Elytral alternate interstices all conspicuously costate except close to base ... ... *hirta*, Blackb.
HH. Alternate elytral interstices (or at least some of them) not costate.
I. Ventral segments closely punctured,—in males sexual sculpture begins on second ventral segment, the apical strongly arcuately emarginate ... *fasciata*, Blackb.
II. Ventral segments not as in *fasciata*.
J. Ventral segments very sparsely punctulate ... ... *planipennis*, Blackb.
JJ. Ventral segments less sparsely punctulate,—in male sexual sculpture begins on third ventral segment ... *longicollis*, Blackb.
AA. Disc of prothorax closely and evenly punctulate *porcata*, Fab.

N. integra, sp. nov. Sat angusta; sat elongata; minus nitida; pilis sat brevibus recurvis et aliis elongatis erectis vestita; nigra, antennis tarsisque rufescentibus; antennis sat gracilibus modice elongatis, articulis 3°—6° gradatim brevioribus, 6°—8° inter se fere æqualibus, 9°—10° que inter se fere æqualibus vix transversis, 11° quam latiori manifeste longiori; capite crebre subrugulose punctulato; prothorace quam latiori vix longiori, in disco antice sparsim subtiliter (postice,—parte mediana angusta excepta,—sat fortiter sat crebre) punctulato, ad latera ruguloso, sulco mediano longitudinali sat brevi (quam prothorax circiter triplo breviori) antice posticeque penitus carenti impresso, ad basin quam ad marginem anticum paullo angustiori, ante medium subconstricto, pone medium utrinque sat fortiter rotundato-dilatato; elytris cancellato-punctulatis, puncturis postice magnitudine decrescentibus, interstitiis omnibus æqualiter a basi ad apicem anguste carinatis; tibiis anticis leviter, intermediis vix, arcuatis; femoribus posticis longissimis; metasterno crebrius sat fortiter, abdomine minus perspicue, punctulatis; tarsis posticis elongatis gracilibus.

Maris abdomine fere lævi, vel potius sparsissime punctulato, segmento 5° ad apicem truncato. Long., 6 l.; lat., $1\frac{3}{5}$ l.

This species is notable for its deep black colour and the uniform sculpture of its elytra which consists of rows of quadrate impressions (the impressions becoming gradually and continuously smaller from base to apex) the interstices between which are narrow, regular, and equal *inter se*. The type is evidently a male. I have a second specimen taken near Adelaide which is, no doubt, a female; it is much larger than the type (long., 9 l. but unfortunately its abdomen has been broken off.

S.W. Australia (Eucla).

N. semicostata, Blackb. All the observed specimens of this insect are, doubtless, males,—assuming that I am right in regarding as a male character the presence of spaces on the ventral segments conspicuous by their very close puncturation.

N. Leai, sp. nov. Minus angusta; minus elongata; minus nitida; pilis erectis brunneis et aliis albis (his in elytris seriatim fasciculatis) vestita; picea, elytris rufescentibus vel potius indeterminate rufo-marmoratis; antennis sat brevibus, modice robustis; capite vermiculato-inæquali sparsim punctulato; prothorace in disco lævi, ad latera rugulose punctulato, sulco longitudinali profundo mediano impresso, quam latiori vix longiori; elytris seriatim punctulatis, puncturis antice magnis foveiformibus retrorsum gradatim decrescentibus, interstitiis 5° 7° que plus minusve carinatis; tibiis anterioribus 4 arcuatis; abdomine fere lævi; tarsis (? maris solum) sat elongatis sat gracilibus. Long., 6 l.; lat., 2 l. (vix).

Quite incapable of confusion with any other species on account of the small fascicles of short white hair with which the elytra are ornamented. Both the specimens before me (I take them to be two males) are somewhat rubbed so that I hesitate to state very confidently the exact disposition of the fascicles, but as far as I can make out they run in about four longitudinal rows,—about 9 or 10 fascicles in each row, and are very conspicuous.

This species must bear much general resemblance to *Opilo floccosus*, Schenkling, but as Herr Schenkling expressly states in describing that insect that it has the securiform maxillary palpi and bifid tarsal lamellæ of an *Opilo*, there can of course be no more than an accidental likeness.

N.S. Wales; taken by Mr. Lea in the Richmond R. district.

N. lugubris, Blackb. I have recently seen examples (males) of this species from N.W. Australia.

N. lævicollis, sp. nov. Sublata; minus elongata; minus convexa; nitida; nigro-picea, antennis tarsisque rufescentibus, elytris pone medium indeterminate vix manifeste rufo fasciatis; antennis sat elongatis minus robustis, articulis

3♂ 4♀ que inter se sat æqualibus ad apicem subclavatis, 5♂—8♀ subcylindricis (5♂ 4♀ longitudine æquali, 6♂—8♀ paullo brevioribus), 9♀ quam latiori vix longiori, 10♂ sat fortiter transverso, 11♀ quam 9ᵘˢ vix longiori; capite crebre subtilissime punctulato, puncturis paullo majoribus sparsissime intermixtis; prothorace quam longiori vix latiori, subtilissime sat crebre punctulato (in disco puncturis minus subtilibus sparsissime intermixtis), ad latera sat grosse ruguloso, sulco longitudinali mediano (antice abbreviato) impresso, ad basin quam ad marginem anticum paullo angustiori, ante medium subconstricto, pone medium utrinque sat fortiter rotundato-dilatato; elytris grosse cancellato-punctulatis, puncturis postice magnitudine decrescentibus, interstitiis antice sat elevatis (alternis ante medium planescentibus); tibiis anterioribus 4 fortiter arcuatis; abdomine æqualiter confertim subtilissime (vix distincte) punctulato, puncturis majoribus sparsissime intermixtis; tarsis posticis sat brevibus. Long., 9 l.; lat., $2\frac{4}{5}$ l.

A darkly coloured nitid and smooth-looking species, of somewhat robust appearance. Its most conspicuous distinctive character consists in the very nitid disc of its prothorax, which is very much less punctured than in most of its congeners. The type is a female. It is allied to *lugubris* I think more closely than any other *Natalis* known to me, from which it may be at once distinguished (apart from characters that are possibly sexual) *inter alia* by the considerably longer discal sulcus of its prothorax. The possibility of its being the female of *lugubris* is at once set aside by the fact that its prothorax is very evidently longer and narrower than the prothorax of the male of that species. Its strongly curved intermediate tibiæ seem to forbid it being regarded as the female of *N. lata*, Waterh., as the curvature of those tibiæ is certainly not a female character in any species of which I know both sexes. *N. Mastersi*, Macl., is so slightly described that it is difficult to be sure whether it is that insect or not. Sir W. Macleay merely mentions some differences between his *Mastersi* and *porcata*. If he referred to *porcata* of either Fab. or Spinola this species cannot be *Mastersi*, as it is of evidently less (not more, as Sir W. Macleay calls his *Mastersi*) elongate form than either sex of either of those species.

Queensland.

N. planipennis, sp. nov. (= *porcata*, Spinola nec Fab.) In Ann. Mag. of N.H. (6) XIII., Mr. C. O. Waterhouse furnished the interesting information that the type of *N. porcata*, Fab., is not the same species that Spinola called *porcata*, Fab., but in his (Mr. W.'s) opinion is likely to be identical with what Spinola called *N. cribricollis*. All authors subsequent to Spinola, I

believe (including myself), have followed him. Mr. Waterhouse passes on to express the opinion that *N. porcata*, Spin. = "N. Marstersii, Casteln." (which I take to be an erroneous rendering of the name *Mastersii*, Macl."), but this I think very doubtful, inasmuch as the Tasmanian species that seems fairly certainly to be Spinola's *porcata* has never occurred to me in (or found a place in any collection I have seen from) any locality North of Victoria, and Macleay's insect was taken at Gayndah in Queensland. The description of *Mastersii* is quite insufficient for identification unless one had a specimen from Gayndah to compare with it.

In Trans. Roy. Soc. S.A., 1890, p. 125, I described a species as *N. fasciata*, from Southern Australia, which is really very close to the Tasmanian one that Spinola called *porcata*, and distinguished it especially by three characters,——the form of the prothorax, the carination of the elytral interstices, and the puncturation of the ventral segments. Since I described *N. fasciata* I have had the opportunity of examining a considerable number of *Natales* from all parts of Australia and have found that the prothoracic distinctions referred to are not very reliable inasmuch as the males of *Natalis* seem always to have their prothorax more elongate than the females, with its posterior dilatation more conspicuous. Nor is the carination of the elytra an altogether satisfactory character, for although in a series of examples of *fasciata* the alternate interstices are evidently more distinct from the other interstices than they are in the Tasmanian insect, yet undoubtedly there is a certain variability in the degree of their prominence in both species. But the very wide difference in the puncturation of the ventral segments furnishes a perfectly satisfactory distinction between *fasciata* and the Tasmanian insect, and I notice another character (indicated in the Latin diagnosis of my description but not sufficiently emphasised) in the evidently longer and more slender hind femora of the latter.

In the male of *N. fasciata* the middle part of the second and third ventral segments bears close asperate fine puncturation (among which a good many evidently larger punctures are intermingled) and the fifth ventral segment is widely and roundly emarginate at the apex; while in the same sex of *porcata*, Spin. (for which I propose the name *planipennis*), both the finer and less fine punctures are much less close than in *fasciata* and are evenly distributed over the segments, the fifth of which is truncate at the apex.

In the female of both these species the puncturation is evenly distributed over the ventral segments, but in *planipennis* the less fine punctures are evidently less numerous than in *fasciata*; and in both the fifth ventral segment is widely obtuse at its apex.

N. longicollis, Blackb. The puncturation of the disc of the prothorax in this species (especially in the female) is notably closer and stronger than in any other *Natalis* known to me except *porcata*, Fab. (in which, however, it is still *more* closely punctured). In fact I have some hesitation as to whether in the tabulation it ought not to be placed with *porcata* rather than with the species having the disc less closely punctured. It seems to be somewhat intermediate. In the male the close sexual puncturation begins on the third ventral segment.

N. inconspicua, Blackb. I am afraid this name must drop, as the insect on which it was founded is certainly, I think, only a variety of *porcata*, Fab., with the prothoracic puncturation abnormally feeble. I have seen several specimens from Tasmania apparently taken in company with typical *porcata* presenting the same peculiarity. In my former tabulation I distinguished *inconspicua* from *porcata*, Fab. (which is called by its synonym "*cribicollis*, Spin."), by its being clothed with long erect hairs, but this is not a satisfactory distinction, as these hairs are very easily rubbed off, and, as a fact, they are present in fresh specimens of *porcata*, although the specimen of that insect before me at the time I wrote my former paper on *Natalis* was without them.

LYMEXYLONIDÆ.

LYMEXYLON.

L. Adelaidæ, sp. nov. Piceum, capite prothoraceque rufescentibus, pedibus sordide testaceis; capite brevi, confertim subtilius punctulato; prothorace quam latiori ut 5 ad 4 longiori, antice vix angustato, profunde canaliculato, crebre subtilius (quam *L. australis*, Er., minus crebre minus subtiliter) punctulato, lateribus leviter arcuatis, angulis posticis sat rectis; elytris confertim subtilissime punctulatis, lineis 4 subelevatis instructis; abdomine nitido subtiliter minus crebre (quam *L. australis*, Er., multo minus crebre) punctulato. Long., 6 l.; lat., $1\frac{1}{5}$ l.

The principal differences between this species and *L. australe*, Er., are referred to above, this species being larger, more strongly and less closely punctulate, with the prothoracic channel much stronger, and the shape of the prothorax different. In *L. australe* the sides of that segment (viewed from above) are very straight (even tending to be slightly *incurved* in front of the middle), while in *L. Adelaidæ* the sides form a continuous gentle curve from base to apex. The difference in puncturation is quite noticeable on all parts except the elytra, on which however, the slightly elevated lines are evidently better defined in *L. Adelaidæ*, and are four in number, there being no trace of more than three on any example that I have seen of *L. australe*.

Compared with the European *L. navale*, Linn., the present species is very differently coloured, with more serrate antennæ, evidently stronger puncturation throughout, a much more elongate prothorax, which is strongly canaliculate, &c. I may say that I am confident in my identification of *L. australe*, Er., as I took my specimens in Erickson's locality, and they agree perfectly with the description.

Adelaide district; in the S.A. Museum (taken by Mr. Jennings).

TENEBRIONIDÆ.

HELÆUS.

The number of species of *Helæus* known to inhabit Australia is now large, and the descriptions are very scattered. In 1887 Sir W. Macleay published in the Proc. L.S., N.S.W., a synopsis of the species then known, but he did not attempt to place their distinctive characters in tabular form further than by dividing them into four groups based upon the nature of the elytral sculpture. I have recently been studying the *Helæi* appertaining to the first of Sir W. Macleay's groups, and believe that I have before me all (except perhaps one doubtfully distinct species) described up to the present time. As they are closely allied *inter se* and some of them are very insufficiently described it will be well to furnish a tabulation of them. I take the opportunity to describe two new species and to furnish some notes on several of the older ones.

Sir W. Macleay's "first group" of *Helæus* is distinguished from the other groups by its species having elytra devoid of pilosity and not furnished with either tubercles or continuous costæ. As some of the species have numerous *granules* on the elytra it may perhaps appear that the distinction between those and "tubercles" is rather fine; as a fact, however, the difference between the granules and tubercles in respect of size is extremely strong, and there are other distinctions between the group containing species with granulated elytra and that whose species have tuberculate elytra which render them very easy to distinguish. Of the former group the smallest specimen I have seen is long., 10 l. (most of the species are much larger still); of the latter the largest size attributed to any species is long., $7\frac{1}{2}$ l. Also, in the former group the projecting front processes of the prothorax (with the exception of one very large species somewhat intermediate between the first group and the group having costæ on the elytra) are extremely broad and blunt, while in the latter group these processes are very much narrower.

Several of the *Helæi* of Sir W. Macleay's "first group" are insufficiently described by their original authors. One of these (*H. princeps*, Hope) has been redescribed by Sir W. Macleay,

but it is doubtful whether he had the true insect before him. I shall therefore call this species "*H. princeps*, Macl. (? Hope)." I have before me a specimen named by Sir W. Macleay "*H. intermedius*, De Brême," which is very likely to be correctly identified, but as there is a doubt I shall call it "*H. intermedius*, Macl. (? De Brême)." Through the kindness of Mr. Lea I have been able to examine a specimen ticketed "C.A. (Mitchell's Exped.)" which is no doubt one of those mentioned by Sir W. Macleay (*loc. cit.*) as being in his opinion *H. colossus*, De Brême. I am inclined to agree with that opinion (although the specimen is very much smaller than *colossus* should be,—long., 12 l., instead of 16 l.) but shall call the species "*H. colossus*, Macl. (? De Brême)." I have examples before me from Central Australia which agree very well with the description (mentioning very conspicuous and unusual characters) of *H. interioris*, Macl. (Darling R.), but as the localities are very far apart and different in character I think the determination sufficiently uncertain to require me to call the insect "*H. interioris*, Macl.?" Of *H. pallidus*, Macl., I have an example named by its author. *H. Browni*, Kirby, I do not know, but the description given by De Brême (that of Kirby is quite useless for identification) is so remarkably identical with the description of *intermedius* as to suggest the idea of the two being a large and a small example of one species. The other species I have named and described myself.

The following is a tabulated statement of the characters of the species. A few lines of explanation however seem to be required in respect of a character that I have adopted for distinguishing the main divisions. If a *Helæus* of this "first group" of Sir W. Macleay be looked at from the side the nature of the extreme margin of the prothorax will be seen to vary much according to the species. It assumes three forms,—First, that of an erect edging, its plane perpendicular or nearly so to the plane of the flanks of the prosternum, and separated from the flanks of the prosternum by a distinct carina-like rib; second, a form differing from that just described only in the absence of the carina-like rib, but having the line of contact between the two planes perfectly well-defined; third, a form in which the erect edging is exchanged for a mere bending upward of the flanks of the prosternum, so that there is no line of demarcation indicating the meeting of two planes. In a long series of *Helæi* examined by me I have not found a single specimen that suggests any doubt of the validity of the above characters. The extreme edge of the elytra is in most species similar to that of the prothorax in structure, except that where the prothoracic marginal edging is of what I have called the third form, that of the elytra is of one of the other forms.

A. Lateral and front face of prothorax with an abruptly erect edging like that of the elytra.
  B. The prothoracic edging opaque, strongly defined both above and below, rarely convex, and usually rugulose.
    C. The prothoracic edging not (or scarcely) narrower than that of the elytra.
      D. Elytra with distinct rows of granules.
        E. Intervals between rows of elytral granules devoid (or nearly so) of granules.
          F. Sutural carina of elytra not (when viewed from the side) straight and parallel with the margin of the elytra ... ...
            G. A strongly elevated longitudinal carina on prothorax in front of the basal tubercle on the elytra — [(? Hope). *princeps*, Macl.
            GG. No longitudinal carina on disc of prothorax .. .. — *aridus*, Blackb.
          FF. Sutural carina of elytra (viewed from the side) parallel with the edge of the lateral margin and straight in the middle (about half) part of its length ... ... — *lubricus*, Blackb.
        EE. Theintervals between rows of elytral granules bearing many similar granules — *interioris*, Macl. ?
      DD. Elytra not having distinct rows of granules ... ... — *ingens*, Blackb.
    CC. The prothoracic edging much narrower than that of the elytra.
      D. Elytra with well-defined rows of granules — *debilis*, Blackb.
      DD. Elytra not having defined rows of granules ... ... — [(? De Brême). *colossus*, Macl.
  BB. The prothoracic edging nitid, smooth, rarely strongly defined below, and usually convex.
    C. The prothoracic edging defined below by a carina-like rib (as in *princeps*, *aridus*, &c.) — (? De Brême). *intermedius*, Macl.
    CC. The prothoracic edging not defined below.
      D. Disc of elytra with numerous small obtuse granules.
        E. Elytra at their widest close to base ... — *scaphiformis*, Blackb.
        EE. Elytra at their widest very far behind base ... ... — *modicus*, Blackb.
      DD. Disc of elytra not granulose but with exceptionally close and conspicuous puncturation ... . — *pallidus*, Macl.
AA. Lateral and front face of prothorax not having an abruptly erect edging like that of the elytra.
  B. The overlapping front processes of prothorax normally wide.
    C. The elytral puncturation extremely fine,—scarcely distinct ... ... — *subseriatus*, Blackb.
    CC. Elytral puncturation very distinct (about as much so as in *pallidus*, Macl.) ... — *elongatus*, Blackb.
  BB. The overlapping front processes of prothorax very narrow ... ... — *brevicostatus*, Blackb.

H. princeps, Hope. Notes on this species will be found below under the heading *H. subseriatus*, sp. nov.

H. princeps, Macl. (? Hope). This species bears considerable resemblance to *H. modicus*, Blackb. It differs by the much better defined, and seriate, discal granules of its elytra; by the presence of a longitudinal strongly elevated carina on its prothorax in front of the basal tubercle; by the basal tubercle being much stouter and less spine-like; by the erect edging of its prothorax being externally opaque, rugulose, and limited below by a carina-like rib, &c.

H. aridus, Blackb. In this species the erect edging of the prothorax is very rugulose and distinctly limited below by a carina-like rib.

H. lubricus, Blackb. The erect edging of the prothorax is opaque but scarcely rugulose, limited below by a very well defined rib.

H. interioris, Macl.? The erect edging is less opaque than in the preceding and very asperately punctulate, limited below by a distinct rib which however is not sharply cariniform.

H. ingens, Blackb. The erect edging is entirely opaque and non-rugulose, not limited below by a defined rib.

H. debilis, Blackb. The prothoracic erect edging resembles that of *H. lubricus*.

H. colossus, Macl. (? De Brême). Prothoracic edging resembles that of *H. lubricus*.

H. intermedius, Macl. (? De Brême). This is the only species known to me (of those in Sir W. Macleay's "first group" having an abruptly erect prothoracic edging which is subnitid, lævigate and convex) in which the edging is limited below by a defined carina-like rib. The insect when immature is of a very pale brown colour.

H. scaphiformis, sp. nov. Ovalis, postice angustatus; minus latus; sat nitidus; sat glaber; piceo-niger, partibus lateralibus antennis pedibusque nonnihil rufescentibus; antennis sat elongatis; prothorace (in disco) postice tuberculo conico armato, ad latera crebre subtilissime granulato, externe (a latere viso) cum elytris margine reflexo ad perpendiculum directo (hoc in prothorace et in elytris æqualiter lato, nitido fere lævi convexo, subtus haud carina determinato) instructo, processubus anticis perlatis, angulis posticis subacutis retrorsum directis; elytris in disco crebre subtilissime (vix distincte) punctulatis et granulis parvis obtusis confuse dispositis sat crebre ornatis, sutura carinata, parte laterali valde reflexa, crebre distincte punctulata et puncturis majoribus nonnullis prope discum impressa. Long., 14—15 l.; lat., 8—8½ l.

A species of peculiar form, being narrower than any other *Helæus* of this group known to me and narrowed hindward almost from the base of the elytra, with the apex in some specimens (probably males) almost acuminate. The lateral parts of the elytra are so strongly turned up that if a specimen be looked at from the side it will be seen that the sutural carina rises very little (or not at all) above the lateral margins, and is, in fact, invisible or nearly so. In the general character of its sculpture it is nearest I think to *H. intermedius*, but its elytra are much more closely granulate than those of that species, and the granules have much less tendency (in fact, none at all) to fall into rows. The prothorax, too, though not narrow in comparison with the elytra is,—like the elytra,—narrower than in the allied species and therefore is less transverse. I have seen only two examples of this insect,—one from Murray Bridge in the S.A. Museum,—one in my own collection (of doubtful locality). This species is certainly not *H. Browni*, I think, as the latter is described "broadly ovate."

S. Australia.

H. modicus, sp. nov. Sat late ovatus; modice nitidis; sat glaber; piceo-niger, pedibus antennisque plus minusve rufescentibus; prothorace (in disco) postice tuberculo sat acuto armato, ad latera crebre subtiliter (minus vel vix distincte) granulato, externe (a latere viso) cum elytris margine reflexo ad perpendiculum directo (hoc in prothorace et in elytris sat æqualiter lato, nitido, fere lævi, convexo, subtus haud carina determinato) instructo, processubus anticis perlatis, angulis posticis sat acutis retrorsum directis; elytris in disco minus subtiliter sat sparsim punctulatis et granulis parvis obtusis sparsim subseriatim ornatis, sutura carinata, parte laterali sat fortiter reflexa, crebre (plus minusve distincte) granulata et puncturis sat magnis prope discum sparsius impressa. Long., 12 l.; lat., 8 l.

Rather close to *H. intermedius*, Macl. (? De Brême), but less nitid, with the lateral portions of the elytra more strongly upturned (though much less strongly than in *H. scaphiformis*) the erect edging of the prothorax not limited below by a carina, the disc of the elytra punctured very evidently less finely, and the sub-basal depression of the elytra (which is very strong in *intermedius*) scarcely defined. The distinct discal puncturation of the elytra forbids my regarding this species as possibly *Browni*, Kirby, one of the few characters mentioned by Kirby being "elytra haud punctata."

S. Australia.

H. pallidus, Macl. Fully matured specimens are of dark colour, so that the name seems applicable only to immature examples.

H. elongatus, Blackb. Since I described this species I have seem two more specimens (one of them a dwarf, long., 10 l.), and I find the tendency of the discal elytral punctures to run in strips between unpunctured intervals less marked than in the type. The species, however, is very easily recognised by the characters attributed to it above in the tabulation.

H. subseriatus, sp. nov. Ovatus; modice latus; nitidus; sat glaber; testaceo-brunneus, in disco parum obscurior, prothoracis elytrorumque marginibus omnibus anguste nigricantibus; antennis sat elongatis; prothorace in disco postice tuberculo conico et ante tuberculum carina brevi longitudinali armato, subtilissime (puncturis nonnullis paullo majoribus intermixtis) punctulatis, parte laterali modice reflexo confertim subtiliter granulosa, basi sinuata, angulis posticis minus acutis, margine haud ad perpendiculum directo; elytris in disco sparsim subtiliter confuse punctulatis et 7-seriatim granulis distinctis instructis (granulis in disci margine externo quam cetera sat majoribus), seriei subsuturalis parte antica circiter tertia vel quarta leviter carinata, parte laterali ut prothoracis granulata et discum versus granulis nonnullis majoribus instructa, sutura sat fortiter carinata, disco fortiter convexo. Long., 15—15½ l.; lat., 9⅖—9⅗ l.

The characters of this species that appear to me to be of specific value are,—the comparatively light colouring with all the margins of prothorax and elytra narrowly blackish (this is certainly not the result of immaturity); the sculpture of the expanded lateral portions of the prothorax and elytra (not punctulate, though apparently so to a casual glance, but under a strong lens) consisting of fine and close granulation; the disc of the prothorax with a well defined short longitudinal carina in front of the basal tubercle or horn; the absence of carinæ (except the sutural one, and a short subsutural one forming the anterior part of the first row of granules) on the disc of the elytra; the presence of seven fairly regular rows of granules on the disc of the elytra, the interstices being finely, sparsely, and confusedly punctulate, and the absence of an erect edging on the lateral margins of the prothorax. *H. princeps*, Hope, is not intelligibly described and might be anything; the disc of its elytra is said to bear "sex punctatæ lineæ elevatæ" and to be sparsely impressed with "puncta atra elevata," whatever that may mean; moreover the description of its colouring does not at all agree with the present species,—which, however, is as likely as any other known to me to be *H. princeps*. If "puncta elevata" are granules the present species may be definitely asserted to be distinct from *princeps* as the disc of the elytra

bears no granules except those in the series and a very small number placed more or less out of line with them, and the granules are emphatically not black. Among its allies with rows of granules, *H. subseriatus* is distinguished by the presence of a short longitudinal strongly elevated carina on the prothorax in front of the basal horn from all except *princeps*, Macl. (? Hope) and *elongatus*, Blackb.

W. Australia.

H. brevicostatus, Blackb. This species must be regarded as connecting Sir W. Macleay's "first group" with his "third group," resembling the latter in the comparative narrowness of the overlapping front processes of its prothorax and in the rudimentary subsutural costæ of its elytra being a little more defined and elongated than in the other species of the first group though extremely different from the well-defined subsutural costæ of the third group. It agrees with the first group in the space between the subsutural quasi-costæ not being flattened.

CHALCOPTERUS.

C. puer, sp. nov. *C. difficili*, Blackb., affinis; oculis inter se magis approximatis (interspatio quam antennarum articuli basalis longitudo subangustiori); prothorace magis crebre punctulato, margine laterali (a latere viso) multo minus fortiter arcuato; elytrorum puncturis seriatis postice obsoletis, interstitiis subtilissime punctulatis; metasterno et episternis minus subtiliter punctulatis; tarsorum posticorum articulo basali quam ceteri conjuncti haud breviori; cetera ut *C. difficilis*, Blackb. Long., 6 l.; lat., 3 l.

It seems hardly necessary to repeat the numerous characters common to this species and *C. difficilis* (which are elaborated in Pr. L.S., N.S.W., 1892, pp. 426-7); the description of *C. difficilis* may be read as applying to *C. puer* in all respects except those specified above. It should, however, be remembered that where *C. difficilis* is compared with *C. cupripennis*, the insect referred to under the latter name is *cupripennis*, Germ. and Blessig, which has been shown (P. L.S., N.S.W., 1893, p. 70) not to be identical with *C. cupripennis*, Hope, but to be *C. affinis*, Blessig. [= *C.* (*Amarygmus*) *Howitti*, Pasc.]

In my tabulation of the species of *Chalcopterus* (P. L.S., N.S.W., 1893, pp. 56, &c.) *C. puer* would fall on p. 59 besides *C. vigilans*, Blackb., and *proximus*, Blackb., though not much resembling them, between which the seriate punctures of its elytra are somewhat intermediate; it, however, differs from both *inter alia* in the very evidently wider interval between its eyes, and its considerably more nitid elytra.

Central Australia.

C. vividus, Blackb. I regret to find that owing to a clerical error the description of this species contradicts one of the characters assigned to it by its place in the tabulation, viz., the black colour of the tarsal vestiture. The vestiture is black (as indicated in the tabulation), although in describing the species I wrote (by some slip of the pen that I cannot account for) "tarsis subtus *fulvo*-setosis." Of course it should have been "tarsis subtus *nigro*-setosis."

C. versicolor, Blackb. In a recent re-examination of my "Revision of the Australian *Amarygmides*" I have come to the conclusion that this species is not well placed in the tabulation. If the tabulation in question be referred to (P. L.S., N.S.W., 1893, pp. 56, &c.) it will be seen that *versicolor* is placed among the species indicated under the letter "E" (on p. 56) as having "the prothorax of normal form and sculpture," but it would really be more at home among those indicated under EE (on p. 61) as having the "base of the prothorax not more than half again as wide as the front, front angles prominent and acute," although the front angles of its prothorax are not so decidedly acute as in some others of that aggregate. It would then fall (under GG.) along with *vividus*, Blackb., which might be thus tabulated farther.

H.	Prothorax strongly transverse; its width being to its length as $1\frac{3}{4}$ to 1	*versicolor*, Blackb.
HH.	Prothorax notably less transverse... ...	*vividus*, Blackb.

As there is a certain approximation in the form of the prothorax between some species which in my tabulation (P. L.S., N.S.W., 1893, pp. 56, &c.) of *Chalcopteri* I placed in the aggregate E (on p. 56), and some which I placed in the aggregate EE (on p. 61); it seems desirable here to state that in those cases the prothorax should be looked at from the side, when it will be found that in the members of the aggregate EE the convexity of the prothorax will appear evidently less than in the species of the other aggregate and the lateral margins straight—the lateral margins in the aggregate E from a similar point of view appearing distinctly arched

C. oblongus, Blackb. This is another species which in a re-examination of my "Revision of the Australian *Amarygmides*" I think might have been placed more satisfactorily than I placed it. It is one of a very small number of species which are more or less intermediate between the two main groups into which I divided the genus *Chalcopterus*, having feeble (but not well marked) ocular sulci. I placed it in the group having ocular sulci, but it would be better placed in the other group. In fact its ocular sulci scarcely differ from those of *C. difficilis* (which I classified among those with the ocular sulci wanting, but with

a note that it has traces of the sulci). Placed among the species not having ocular sulci, *C. oblongus* will take its place beside *C. placidus*, Blackb., from which it differs *inter alia multa* in having the seriate punctures of the elytra (as in *confluens*, Blackb.) almost lost among the interstitial punctures, and the elytra marked with longitudinal zones of various metallic colours.

C. Iris, sp. nov. Oblongus, sat parallelus (forma fere ut *C. longuli*, Blackb. vel *Leai*, Blackb. sed magis depressa), sat nitidus; niger, elytris purpureo—et viridi—et aureo—versicoloribus, tarsis subtus fulvo-setosis; capite æqualiter distincte sat crebre punctulato; oculis quam antennarum articuli basalis longitudine vix magis inter se remotis; sulcis ocularibus nullis; antennis ut *C. longipennis*, Hope; prothorace quam longiori (et postice quam antice) ut $1\frac{2}{3}$ ad 1 latiori, crebre distincte punctulato, antice modice vix sinuatim emarginato, a basi antrorsum (superne viso) ad medium leviter (antice arcuatim sat fortiter) angustato, basi media sublobata, angulis anticis fere rectis; elytris crebre minus subtiliter punctulatis, haud striatis, inter puncturas confusas puncturis quam ceteræ paullo majoribus (fere ut *C. confluentis*, Blackb.) impressis; prosterno medio sulcato; metasterno sat distincte punctulato et oblique rugato, episternis minus nitidis obsolete punctulatis; abdomine antice distincte crebre (postice obsolete) punctulato et longitudinaliter rugato; femoribus anticis subtilius punctulatis; tarsorum posticorum articulo basali quam ceteri conjuncti paullo breviori. Long., $7\frac{1}{5}$ l.; lat., $3\frac{3}{5}$ l.

A very distinct species. In my tabulation of the species of *Chalcopterus* (P. L.S., N.S.W., 1893, pp. 56, &c.), there would be a doubt whether it should be placed under E (on p. 62) having the prothorax normal or under EE (on p. 65) having the prothorax nearly parellel-sided in the hinder half. If placed under E it would stand beside *velutinus*, Macl. (on p. 63),—with which, however, it is not at all closely allied,—and might be thus distinguished from it:

O. Seriate puncturation of elytra quite distinct ... *velutinus*, Macl.
OO. Seriate puncturation of elytra scarcely distinct from the interstitial ... ... *Iris*, Blackb.

If placed under EE, *C. Iris* would stand beside *C. imperialis*, Blackb., as not having the elytral interstices "very finely" punctured (though they are punctured more finely than in *imperialis*), and would be distinguishable from *imperialis* as follows:—

I. Seriate puncturation of elytra very distinct ... *imperialis*, Blackb.
II. Seriate puncturation of elytra scarcely distinct from the interstitial ... ... *Iris*, Blackb.

The species to which this one appears to me most nearly allied is *C. Leai*, Blackb. (regarding the position of which in the genus some remarks will be found, applying also to this insect, in P. L.S., N.S.W., 1893, p. 80), but the exigencies of classification remove it from the neighbourhood of that species in my tabulation on account of its eyes being less widely separated from each other.

Queensland; sent to me by Mr. French.

C. Cræsus, sp. nov. *C. Mercurio*, Blackb., affinis; oculis inter se minus (vix magis quam antennarum articuli 2^{i} longitudine) remotis; prothorace quam longiori fere duplo latiori, distincte (sed subobsolete) punctulato, antice distincte (et fortiter sinuatim) emarginato et minus angustato, elytris parum distincte striatis, striis magis subtiliter punctulatis, interstitiis parum distincte convexis; cetera ut *C. Mercurius*. Long., $6\frac{1}{2}$ l.; lat., $3\frac{1}{5}$ l.

Except in respect of the differences specified above the description of *C. Mercurius* (P. L.S., N.S.W., 1892, p. 449) applies to the present species, which in my tabulation of the species of *Chalcopterus* (*loc. cit.* 1893, pp. 56, &c.) would stand beside *Mercurius* (on page 64), and may be thus distinguished from it:—

L.	Interval between eyes considerably greater than length of 2nd antennal joint	*Mercurius*.
LL.	Interval between eyes scarcely greater than length of 2nd antennal joint	*Cræsus*.

This species is also very near *C. major*, Blackb., which has the interval between its eyes of about the same width, but differs in its notably larger size, different colour (the elytra being much less conspicuously tinged with purple) and different elytral sculpture, the punctulate striæ being effaced near the base, while in *Cræsus* the punctulate striæ are continuous quite close to the base.

N.W. Australia (given to me, I believe, by Mr. J. J. Walker).

C. major, Blackb. Since I described this species (P. L.S., N.S.W., 1892, p. 449), I have seen some more specimens, and am now satisfied that the type, which I mentioned as probably a male is in reality a female. The male is somewhat smaller (the smallest I have seen is long. $7\frac{3}{4}$ l.) with the apical ventral segment more strongly punctured than in the female and with its surface even, while in the female there is a well marked longitudinal concavity.

C. proditor, sp. nov. *C. majori*, Blackb., affinis; colore in elytris viridis nonnihil purpureo-micans; oculis inter se manifeste magis remotis; elytrorum interstitiis perspicue magis convexis apicem versus fere subcostatis; cetera ut *C. major*. Long., 8—$9\frac{1}{2}$ l.; lat., 4—$5\frac{1}{5}$ l.

Apart from the characters mentioned above, the description of *C. major* (P. L.S., N.S.W., 1892, p. 449) applies to this species. In my tabulation of the species of *Chalcopterus* (*loc. cit.*, 1893, pp. 56, &c.) *C. proditor* would stand beside *C. major*. The colour of the elytra is difficult to describe,—it may be called "green with a tendency to look blue in certain lights."

N. W. Australia (Mr. French, &c.).

C. gracilicornis, sp. nov. *C. majori*, Blackb., affinis; capite prothoraceque nigris, elytrorum sutura aureo-micanti; oculis quam antennarum articuli basalis longitudine fere magis inter se remotis; antennis gracillimis, articulo 3° quam 1us 2us que conjuncti multo longiori, articulis 8—11 quam mox præcedentes multo brevioribus; elytris multo magis subtiliter seriatim, interstitiis paullo magis crebre magis distincte punctulatis; abdomine magis perspicue punctulatis; cetera ut *C. major*. Long., 9 l.; lat., $4\frac{3}{5}$ l.

Apart from the characters mentioned above, the description of *C. major* (P. L.S., N.S.W., 1892, p. 449) applies to this species. In my tabulation of the species of *Chalcopterus* (*loc. cit.*) *C. gracilicornis* would stand beside *C. major*. The interval between its eyes is perhaps a trifle wide for that aggregate, but is notably narrower than in the aggregate containing *Leai*, *similis*, &c.

As the above descriptions add to *Chalcopterus* several species closely allied to *major* and *Mercurius*, it seems desirable to furnish a new tabulation of distinctive characters for the species that now stand under "J prothorax notably less nitid than the elytra." (P. L.S., N.S.W., 1893, p. 64),—as follows :—

K. Width of interval between the eyes scarcely, if at all, greater than length of second antennal joint.	
L. Size large ($7\frac{3}{4}$—$9\frac{1}{2}$ l.). Elytral striæ effaced near base	*major*, Blackb.
LL. Size much smaller (about $6\frac{1}{2}$ l.) Elytral striæ almost reaching actual basal line of elytra	*Crœsus*, Blackb.
KK. Width of interval between the eyes notably greater than length of second antennal joint	
L. Antennæ of average robustness.	
M. Size large (8—$9\frac{1}{2}$ l.) Elytra for the most part green, scarcely tinged with purple ...	*proditor*, Blackb.
MM. Size much smaller (about 7 l.). Inner half of elytra entirely bright purple ...	*Mercurius*, Blackb.
LL. Antennæ very exceptionally slender ...	*gracilicornis*, Blackb.

C. boops, sp. nov. *C. oculari*, Blackb., affinis; angustus, subcyclindricus; prothorace nigro, elytris suturam versus viridi-micantibus; antennis gracilibus, articulo 3° quam 1us 2us que conjuncti sat longiori; prothorace quam longiori ut

$1\frac{1}{3}$ ad 1 latiori, minus crebre minus fortiter punctulato; prosterno medio haud carinato; corpore subtus magis subtiliter punctulato; cetera ut *C. ocularis*. Long., 6—7 l.; lat., $2\frac{3}{5}$—$3\frac{2}{5}$ l.

Apart from the characters mentioned above, the description of *C. ocularis* (P. L.S., N.S.W., 1893, p. 79), applies to this species, which stands beside it in my tabulation of the species of *Chalcopterus* (*loc. cit.*, p. 64). It differs from all the hitherto described Australian *Chalcopteri* except *ocularis* in its (all but contiguous) eyes, and from *ocularis* by its different colouring, much more slender antennæ, less tranverse prothorax, &c.

W. Australia; sent to me by Mr. French.

C. zonatus, sp. nov. *C. Mercurio*, Blackb., affinis; coloribus in elytris magis vittatim dispositis; capite inter oculos magis perspicue punctulato; oculis magis inter se remotis; antennarum articulo 3° minus elongato; prothorace multo magis nitido, distincte sat crebre punctulato; elytrorum striis antice et suturam versus quam in ceteris partibus multo minus fortiter punctulatis, interstitiis paullo magis perspicue punctulatis; prosterno medio haud sulcato; cetera ut *C. Mercurius*. Long., $7\frac{1}{5}$ l.; lat. 4 l.

Except in respect of the characters mentioned above the description of *C. Mercurius* (P. L.S., N.S,W., 1892, p. 450), may be read as the description of this insect. In my tabulation of the species of *Chalcopterus* (*loc. cit.*, 1893, pp. 56, &c.), the present species would stand beside *mimus*, Blackb., under JJ, and may be distinguished from it as indicated under the next species (*C. costatus*).

N. Queensland (Mr. Koebele).

C. costatus, sp. nov. Elongatus, subparallelus; modice nitidus; niger, elytris obsure cyaneis latera versus nonnihil aureomicantibus; capite sat æqualiter crebre minus subtiliter punctulato; oculis antennarum articuli basalis longitudine inter se remotis; sulcis ocularibus nullis; antennis quam corporis dimidium subbrevioribus modice robustis, apicem versus haud incrassatis, articulo 3° quam 1us 2us que conjuncti vix longiori quam 4us 5us que conjuncti parum breviori, articulis apicalibus quam præcedentes haud brevioribus; prothorace quam longiori ut $1\frac{1}{2}$ ad 1 (postice quam antice ut $1\frac{5}{7}$ ad 1) latiori, subtiliter sat crebre punctulato, antice fere truncato, a basi antrorsum (superne viso) arcuatim angustato, basi media parum lobata, angulis (superne visis) obtusis (anticis ad apicem summum certo adspectu minute fere subdenticulatis); elytris profunde striatis, striis crenulato-punctulatis, interstitiis omnibus obtuse costiformibus vix

perspicue punctulatis; prosterno medio vix distincte carinato; corpore subtus sat obsolete punctulato; femoribus anticis antice subtiliter punctulatis; tarsis subtus fulvo-setosis, posticorum articulo basali quam apicales 2 conjuncti vix longiori. Long., 7 l.; lat., $3\frac{2}{5}$ l.

An extremely isolated species in the genus on account of its decidedly costate elytra. In a natural arrangement it would stand, I think, near *longiusculus*, Blackb., but the exigencies of classification would cause it to stand in my tabulation of the *Chalcopteri* beside *mimus*, Blackb., from which it, and the preceding species, may be thus distinguished :—

K. Interstices of elytra feebly convex.
  L. Elytral striæ much more strongly punctured near apex than near base ... ... *zonatus*, Blackb.
  LL. Elytral striæ evenly (or nearly so) punctured ... *mimus*, Blackb.
KK. Interstices of elytra quite strongly costate ... *costatus*, Blackb.

An example from Queensland in Mr. French's collection must, I think, be referred to this species, although it is coloured very differently, the elytra being bright blue, with the suture and all the striæ purple.

W. Australia.

C. acutangulus, sp. nov. Oblongo-ovalis; sat nitidus; niger, elytris aureo cupreo et viridi versicoloribus; capite crebre subtilius æqualiter punctulato; oculis quam antennarum articuli basalis longitudine paullo magis inter se remotis; sulcis ocularibus subfoveiformibus; antennis quam corporis dimidium sat brevioribus minus robustis, articulis 6—11 perspicue dilatatis inter se sat æqualibus, articulo 3° quam 1us 2us que conjuncti vix longiori quam 4us 5us que conjuncti paullo breviori; prothorace quam longiori (et postice quam antice) fere duplo latiori, crebre subtilius fere ut caput punctulato, antice leviter emarginato, a basi antrorsum (superne viso) angustato sed parum arcuato, basi media vix lobata, angulis anticis obtusis posticis (superne visis) acutis fere dentiformibus; elytris vix striatis, seriatim subtiliter punctulatis, interstitiis planis vel vix obsolete convexis subtilius (fere ut prothorax) crebre punctulatis; prosterno medio planato; corpore subtus sparsim subtiliter punctulato, abdomine crebre rugato; femoribus anticis antice subtiliter punctulatis; tarsis fulvo-setosis, posticorum articulo basali ceteris conjunctis longitudine æquali. Long., 6—7 l.; lat., $3\frac{1}{5}$—$3\frac{2}{5}$ l.

This species, and the next described, fall into an aggregate distinguished from all other described *Chalcopteri* by the presence of ocular sulci in combination with legs of dark colour (the tarsi having fulvous vestiture). They are both extremely distinct

from the three previously described members of the same aggregate. *C. acutangulus*, in a natural arrangement, would stand near *C. lepidus*, Blackb., which differs from it *inter alia* in its eyes being still wider apart, its tarsal vestiture black, and the hind angles of its prothorax (viewed from above) much less prominent.

Central Australia.

C. mundus, sp. nov. Elongato-ovalis, subparallelus; sat nitidus, capite prothorace que subopacis; niger, prothorace elytris que cupreo et viridi versicoloribus; capite æqualiter subtilissime punctulato; oculis antennarum articuli basalis longitudine inter se remotis; sulcis ocularibus subfoveiformibus; antennis fere ut *C. acutanguli* sed articulo 6° vix dilatatis; prothorace quam longiori (et postice quam antice) fere duplo latiori, subtiliter minus crebre punctulato, antice (superne viso) subtruncato, a basi antrorsum (superne viso) arcuatim angustato, basi media leviter lobata, angulis (superne visis) anticis obtusis posticis subacutis; elytris haud striatis, seriatim sat fortiter punctulatis (puncturis seriatis postice haud minus fortiter impressis), interstitiis planis vix perspicue punctulatis; prosterno medio antice carinato; corpore subtus vix punctulato, abdomine leviter rugato; tarsis fulvo-setosis, posticorum articulo basali ceteris conjunctis parum breviori. Long., 5 l.; lat., $2\frac{1}{3}$ l.

Evidently allied to the preceding *(C. acutangulus)* but *inter alia* much smaller, with the interval between the eyes narrower, the elytral seriate punctures much larger, &c., &c. Also bears much superficial resemblance to several species which have dark tarsal vestiture or no ocular sulci. The continuance to the apex of the elytra (without enfeeblement) of the seriate punctuation is a somewhat unusual character.

This species and the preceding (*C. acutangulus*) do not fit any line to which a specific name is attached in my tabulation of *Chalcopterus* (P. L. S., N.S.W.,1893, pp. 56, &c.). They would stand under "CC" (on p. 69), but not under either "D" or "DD" (the two sub-divisions of "CC"). Their place in the tabulation will be found set forth under the heading *C. obtusus*, Pasc., below.

C. (Amarygmus) obtusus, Pasc. In my "Revision of the *Amarygmides*" I stated (P. L.S., N.S.W., 1893, p. 54) that this species was one of four *Chalcopteri* which I had been unable to identify. I have since received from Mr. Lower an example from Queensland which agrees fairly well with Mr. Pascoe's description. The discrepancies are that the colour of the elytra should be *uniformly* brownish-copper, but is tinged with green along the

suture and the hind part of the sides, that the prothorax is implied to be black whereas it is black with some coppery reflection, and that the punctures of the prothorax should be "minute" but are scarcely so fine as is indicated by that word. I think, however, that I may venture to assign a place in my tabulation to *obtusus* on the strength of this specimen, enclosing the name, however, between brackets to indicate that (as in the case of other species so marked in the tabulation) there is an element of doubt in its identification.

Its place in the tabulation should be beside *acutangulus* and *mundus* (described above) on page 69, *loc. cit.*, and the three will have to follow *lævicollis*, Blessig., thus :—

DDD. Prothorax punctulate ; eyes not bordered by a carina.
  E. The elytral seriate punctures comparatively large (much more so than in *Howitti*, Pasc.).
    F. The elytra evidently striate (size comparatively large—7 l. or more) ... ... [*obtusus*, Pasc.]
    FF. The elytra absolutely devoid of striation... *mundus*, Blackb.
  EE. The elytral seriate punctures much finer ... *acutangulus*, Blackb.

C. (Amarygmus) rufipes, Macl. In my Revision of the *Amarygmides* I treated this species as being the only representative of the aggregate distinguished by the following characters in combination, viz., ocular sulci present, legs not of uniformly dark colour. There is every reason to believe that the names *picipes*, Macl., and *nigritarsis*, Pasc., were given to insects appertaining to this aggregate, and in my Revision I indicated the opinion that they might both be synonymous with *rufipes*, Macl. Among the numerous *Chalcopteri* that I have accumulated since the publication of my Revision I find at least three good species of this aggregate closely allied to, but distinct from, *rufipes*, and it is extremely difficult to determine whether any of them is *picipes* or *nigritarsis*. As regards *rufipes*, I possess an example from Gayndah (the original locality) sent to me by Mr. Masters (the original captor of the species), and ticketed by him "compared with type." It does not agree with Sir W. Macleay's description, inasmuch as its head, prothorax, and under surface are (not black but) blue, and its legs are not "entirely red," but have the tarsi of dark piceous colour. I consider, nevertheless, that the specimen is rightly named, and have no doubt the description is wrong, as Mr. Masters is about the most careful and reliable authority I know in the matter of identifying a species by comparison with the type specimen. One of the three species mentioned above I am disposed to think is *picipes*, Macl., the description of which is merely a statement that its elytra (not blue but) green, its legs (not red but) piceous brown, its elytra a little more largely punctured, and its form shorter and broader distinguish it from *rufipes*. The specimens I am discussing

present these characters—though the last mentioned two are only slightly marked, and in addition its head is of black colour and is very much more strongly punctured, its prothorax is black (scarcely tinged with green), and the interval between its eyes is quite evidently narrower. *C. nigritarsis* is either identical with one or other of Sir W. Macleay's species or is an insect I have not seen ; for it cannot be either of the other two species before me on account of its seriate elytral punctures being described as "minute." I do not think it can be the species I take to be *picipes*, Macl., inasmuch as its head is called "nearly impunctate," but it may well be a colour var. of *rufipes* with the description (or rather with Mr. Master's type) of which it agrees very well in all respects except in its elytra being "green." I have seen several specimens of *rufipes*, and find the elytra to vary from blue towards a reddish purple tone, but have not seen any with elytra green. So *nigritarsis* remains an enigma to me. There are thus before me two species (having ocular sulci and legs not entirely dark) which are distinct from any species yet described possessing those characters, but unfortunately one of them is represented by a broken specimen unfitted to be treated as a type. I proceed to name and describe the other.

C. jucundus, sp. nov. Ovalis (modice late) ; sat nitidus ; viridis, capite nigro, prothorace nigro viridi-micanti, femoribus tibiisque testaceo-brunneis, tarsis piceis ; capite minus crebre (in clypeo crebre) subtiliter punctulato, parte mediana lævi ; oculis quam antennarum articuli basalis longitudine nullo modo minus inter se remotis ; sulcis ocularibus bene definitis ; antennis quam corporis dimidium subbrevioribus sat robustis apicem versus vix incrassatis, articulo 3° quam 1us 2us que conjuncti sat longiori quam 4us 5us que conjuncti sat breviori, articulis apicalibus quam præcedentes parum brevioribus ; prothorace quam longiori ut $1\frac{5}{8}$ ad 1 (postice quam antice fere duplo) latiori, subtilissime vix perspicue punctulato, utrinque basin versus oblique subsulcato, antice vix emarginato, a basi antrorsum (superne viso) arcuatim angustato, basi media vix lobata, angulis (superne visis) obtusis ; elytris haud striatis, seriatim punctulatis, punctturis sat magnis (fere ut *C. lævicollis*, Blessig, sed basin versus magis subtilibus et apicem versus subobsoletis), interstitiis planis lævibus ; prosterno medio planato ; corpore subtus fere lævi ; femoribus anticis antice subtilissime punctulatis ; tarsis subtus fulvo-vestitis, posticorum articulo basali quam ceteri conjuncti parum breviori. Long., 7 l. ; lat., $3\frac{4}{5}$ l.

This species is easily distinguishable from the other described ones having ocular sulci and legs not uniformly of dark colour by

the much coarser puncturation of its elytral series. In my tabulation of the *Chalcopteri* (P. L.S., N.S.W., 1893, pp. 56, &c.) it stands beside *C. rufipes*, Macl., from which it differs (as stated above) by its elytral puncturation. It is possible that the oblique sulcus near the posterior angle on either side of the prothorax may be an individual peculiarity of the typical specimen.

Victoria; I have no record of the exact locality.

RHIPIDOPHORIDÆ.

EUCTENIA.

E. occidentalis, sp. nov. Mas. Obscure castanea; subnitida; breviter pubescens; capite supra prothoracem elevato, subfortiter sat crebre punctulato; oculis magnis supra et subtus subcontiguis; antennarum articulo basali modico (fere ut *E. sericeæ*, Gerst., sed minus dilatato), 2° brevi, 3° quam basalis vix breviori, 4° brevi, 5° ramum elongatum emittenti, 6° ramum etiam longiorem emittenti, 7°—11° ramos inter se æquales (sed quam 6ⁱ longiores) emittentibus; palporum maxillarium articulo apicali quam *E. sericeæ* longiori et graciliori; prothorace conico, cum elytris crebre aspere subfortiter (quam *E. sericeæ* multo magis fortiter) punctulato, basi fortiter (fere ut *E. sericeæ*) sinuata, angulis posticis acutissimis; elytris (fere ut *E. sericeæ*) lineis elevatis obsolete instructis; pedibus ut *E. sericeæ*. Long., $4\frac{1}{2}$ l.; lat., $1\frac{1}{2}$ l. (vix).

It is only with extreme hesitation that I refer this species to *Euctenia*. It would seem much more at home in *Pelecotomoides* were it not for the one character of its head being elevated above the level of the prothorax (as in *Euctenia*), a character to which Mm. Gerstäcker and Lacordaire seem to attribute much importance. The eyes and antennæ are altogether those of a *Pelecotomoides*. It would, perhaps, be better to found a new genus for it, but I abstain from doing so on the ground that the observation of more species may quite possibly show the elevation of the head to be of less than generic importance. In fact, I have in my collection examples (unfitted by their condition or sex for being types) of several species that seem in respect of some character or another to be intermediate between *Pelecotomoides* and *Euctenia*.

W. Australia; Coolgardie (in the S.A. Museum).

EVANIOCERA.

Below will be found descriptions of two new species appertaining to this genus, and notes on a species previously described by me. The following tabulation will show the male characters of the described species with the exception of one that was des-

cribed by Sir W. Macleay, without any detailed record of such characters, as *E. Gerstäckeri*; and one that was doubtfully referred by Mr. Champion to *E. Gerstäckeri*, Macl., likewise without a sufficiently detailed description of the antennæ to enable me to place it in the tabulation confidently. Notes on those two will be found below. It should be observed that the length of the third and fourth joints of the antennæ (mentioned in the tabulation) has reference, not to the length of the *rami* of those joints, but to the length of the basal piece of the joints (from which their rami are emitted).

A. Antennæ of male with nine rami.
  B. The third joint of the antennæ much longer than fourth.
    C. Eyes widely separated from each other ... *pruinosa*, Gerst.
    CC. Eyes approximate *inter se* ... .. *Meyricki*, Blackb.
  BB. The third and fourth joints of antennæ subequal *inter se* ... ... *perthensis*, Blackb.
AA. Antennæ of male with eight rami.
  B. The third joint of the antennæ strongly transverse ... ... *nervosa*, Gerst.
  BB. The third joint of the antennæ not transverse *minuta*, Blackb.

E. Meyricki, sp. nov. Mas. Picea, prothoracis lateribus elytris pedibusque rufescentibus, capite palpis antennisque nigris; minus nitida; confertim subtiliter punctulata; cinereo pubescens (lineatim in elytris); oculis magnis in fronte sat approximatis (interspatio quam antennarum articuli basalis longitudo haud latiori); antennarum articulis basali valde compresso subtriangulari, 2° minuto transverso, ceteris ramos elongatos singulos emittentibus, articuli 3ⁱ ramo quam ceterorum breviori et a ramo articuli 4ⁱ longe remoto; prothorace conico, basi valde bisinuata, lateribus (superne visis) vix sinuatis; elytris postice sat angustatis. Long., $2\frac{2}{5}$ l.; lat., 1 l.

Resembles *E. nervosa*, Gerst., somewhat in the disposition of the whitish pubescence on the elytra, but differs from it *inter alia* in the third joint of its antennæ emitting a long ramus, and in the much narrower interval between the eyes; from *pruinosa*, Gerst., it differs by the ramus of the third antennal joint being much longer, the eyes much more approximate, the elytra *striped* (rather than marbled) with whitish pubescence, &c., from *Gerstäckeri*, Macl. (which is practically undescribed) by the linear disposition of the elytral pubescence, and no doubt other characters; from *E. Gerstäckeri*, Champ. (?Macl.), by its striped elytra, and probably other characters (Mr. Champion does not describe the antennæ, eyes, &c., minutely), and from *E. minuta*, Blackb., by its much larger size, more approximate eyes, head more elongate, and much more finely rugulose in front, elytra very differently coloured, black mandibles (they are red in *minuta*), &c. It should be noted that the long interval between

the first and second rami of the antennæ results from the elongate form of the third joint.

W. Australia; King George's Sound; taken by Mr. E. Meyrick.

E. perthensis, sp. nov. Mas. Picea; minus nitida; confertim subtiliter punctulata; pube fulva et albida vestita (hac in prothorace postice, in elytrorum basi suturaque, in corpore subtus et in tibiis condensata); oculis modicis inter se late remotis; antennarum articulis basali modico minus dilatato, 2° minuto transverso, ceteris ramos elongatos singulos emittentibus, articuli 3ⁱ ramo quam 4ⁱ parum breviori et ad 4ⁱ ad basin contiguo; prothorace conico, basi valde bisinuata, lateribus (superne visis) vix sinuatis; elytris postice modice angustatis. Long., $2\frac{2}{5}$ l; lat., 1 l.

This species seems to be entirely piceous, and to owe its variegation entirely to pubesence. The upper surface is densely clothed with very fine pubesence, which is of red-brown colour except on certain parts where it is whitish,—viz., the hind part of the prothorax and the front part and suture of the elytra. The underside is uniformly but less closely (and consequently somewhat inconspicuously) clothed with very fine pale hairs, and similar hairs clothe the legs, being more conspicuous and pallid on the tibiæ and tarsi than on the femora. The head and antennæ are of darker colour than the general surface. Apart from colour and markings (which seem very distinctive) the present insect is at once distinguishable from *nervosa*, Gerst., *pruinosa*, Gerst., *Meyricki*, Blackb., and *minuta*, Blackb., by the antennæ of its male having the ramus of the third joint nearly as long as that of the fourth, and at the base scarcely further from that of the fourth than the latter is from that of the fifth. As noted above the descriptions of *Gerstäckeri*, Macl., and *Gerstäckeri*, Champ. (? Macl.) are not sufficiently minute for comparison apart from colour, but I am almost sure that the insect before me is not identical with Sir W. Macleay's, as the colouring seems entirely different, and the remoteness of locality is unfavourable to the idea of identity. *Gerstäckeri*, Champ., evidently has very different markings; its antennæ have the ramus of the third joint elongate, but it is not specified whether the first ramus is placed at a long interval from the second; but even if Mr. Champion's insect is identical with mine, it is somewhat certainly not *Gerstäckeri*, Macl., and in that case needs a new name.

W. Australia; taken at Perth by Mr. Meyrick.

E. minuta, Blackb. In comparing this very small insect with the above two species, I regret to find that there is an error in my description of its antennæ (Trans. Roy. Soc., vol. XVI., p.

178), as the first ramus is emitted from the basal end of the fourth joint (not, as I supposed, from the apex of the third joint). The peculiar antennal structure of each ramus (except, of course, the apical one) being connected with the *base* of its joint is easily seen in the larger species, but in the much smaller one very careful examination is required to see which joint emits it, and it is not a character that one would look for unless one were expecting it,—indeed, it is only by observing it under a high power that I have been able, even now, to determine the point.

EMENADIA.

Below I furnish descriptions of six new species of this genus, preceded by a tabulation showing distinctive characters for all the species as yet described, except *luteipennis*, Macl. (the description of which is insufficient for identification). It should be noted that I have not seen specimens of *tricolor*, Gerst., *luteipennis*, Champ. (? Macl.), *maculicollis*, Bohem., and *cucullata*, Macl., but that the descriptions of those species mention characters which enable me to place them in the tabulation.

A. Head nitid and (at any rate except in front) levigate or nearly so.
  B. Prothorax not carinate.
    C. Apex of prothoracic lobe not upturned.
      D. Apex of prothoracic lobe not emarginate.
        E. Head black.
          F. Elytra closely punctulate.
            G. Basal 2 joints of hind tarsi much compressed; hind angles of prothorax considerably divergent ... ... *diversiceps*, Blackb.
            GG. Basal 2-joints of hind tarsi much more slender; hind angles of prothorax not or scarcely divergent ... *sobrina*, Waterh.
          FF. Elytra sparsely punctured ... *difficilis*, Blackb.
        EE. Head more or less red.
          F. Head entirely red ... ... *tricolor*, Gerst.
          FF. Head red in front, black behind.
            G. Prothorax and elytra sparsely punctured ... ... *luteipennis*, Champ. [(? Macl.)
            GG. Prothorax and elytra closely punctured ... ... *Championi*, Blackb.
          FFF. Head black in front, red behind *capito*, Blackb.
      DD. Apex of prothoracic lobe emarginate *maculicollis*, Bohem.
    CC. Apex of prothoracic lobe up upturned *Novæ-Hollandiæ*, Gerst.
  BB. Prothorax bearing a longitudinal median carina ... ... *cucullata*, Macl.
AA. The whole of the head conspicuously punctulate.
  B. The head black, and very closely punctured even behind ... ... *punctulaticeps*, Blackb.
  BB. Head mostly red, with the puncturation notably less close behind ... ... *interioris*, Blackb.

E. diversiceps, sp. nov. Nigra, cyaneo-iridescens, antennarum basi et oris membris picescentibus, segmentis ventralibus postice rufescentibus ; nitida, capite antice sat crebre vix aspere postice subtilissime sparsissime punctulato ; prothorace elytrisque (horum puncturis sat elongatis, illius basin versus minus crebris magis grossis) crebre sat fortiter punctulatis ; elytrorum disco longitudinaliter impresso ; tarsorum posticorum articulis basalibus 2 compressis.

Var. Prothorace elytrisque plus minusve rufescentibus. Long., $5\frac{3}{4}$ l. ; lat., 2 l.

The blue iridescence of this species is probably characteristic. The puncturation of the head and elytra is not unlike that of *E. sobrina*, Waterh. ; that of the prothorax is notably coarser and less close near the base. The prothorax resembles in shape that of *E. sobrina*, Waterh., except in having its hind angles distinctly divergent. An example in the S.A. Museum has the disc of the elytra longitudinally reddish, and one in my collection has the elytra nearly entirely (and the prothorax entirely) reddish ; both have distinct traces of bluish iridescence.

S.W. Australia.

E. sobrina, Waterh. I have seen only two specimens that I can refer to this species, which considerably resembles in colouring some varieties of *E. diversiceps*, Blackb., but is of notably narrower form, with the hind angles of its prothorax even more decidedly non-divergent, and the basal two joints of the hind tarsi evidently more cylindric. The two examples before me are both females, but the tarsal character is certainly not sexual, as the females of *E. diversiceps* have the basal two joints quite strongly compressed. The prothorax (especially behind) is much more closely, and less coarsely, punctulate than than of *diversiceps*.

E. difficilis, sp. nov. Nigra, prothorace abdomine tibiis tarsisque (nonnullorum exemplorum) et elytris antennis mandibulis palpisque (plus minusve) testaceis ; nitida ; capite antice crebre fortius postice sparsissime subtilissime punctulato ; prothorace supra æquali minus crebre punctulato lobo mediano ad apicem rotundato, angulis posticis divergentibus ; elytris in disco longitudinaliter impressis, antice sparsius (apicem versus crebre) punctulatis, puncturis subelongatis. Long., 3—$4\frac{1}{2}$ l. ; lat., 1—$1\frac{1}{2}$ l.

The following characters in combination distinguish this species from its previously described congeners :—Head black, its hind part scarcely distinctly punctured, median lobe of prothorax rounded and not upturned and not carinate, elytra more or less testaceous and with comparatively sparse isolated (except close to the apex) punctures. It is variable to the last degree in colour and markings ; in a long series, however, of both sexes I

find the head, sterna, and femora, invariably black or pitchy-black. The prothorax varies from entirely testaceous red, through forms in which the disc is diversely marked with fuscous or blackish, to a form in which it is entirely black. The elytra vary from a rare form in which they are entirely testaceous except a slight infuscation round the middle part of the base, through forms in which the whole base is black or blackish with that colour extended, more or less widely, for a greater or less distance along the suture, to forms in which the sutural blackening is extended to fill up the whole apical quarter. The number of antennal joints having their base testaceous (the rami of the male and the serrations of the female are invariably blackish) is variable. The hind angles of the prothorax are somewhat strongly divergent.

E. tricolor, Gerstäck. I have not seen any specimen that I can refer to this species, which is described as having the head and prothorax and the under surface red. Although the *Emenadiæ* are extraordinarly variable in the colours and markings of the prothorax and elytra, I have not seen (even in some fairly long series) any variation in the colour of the head in any species. Gerstäcker evidently had at least more than one specimen of *tricolor* before him, so that his description cannot have been founded on an isolated extreme aberration of a species usually having the head black. Mr. Waterhouse (Ann. Nat. H., 1883) describes a black-headed male *Emenadia*, which he says is probably the male of *tricolor*, and supposes the difference of colour to be sexual. I have not seen any specimen coloured as that male is described, but I can say positively that in no *Emenadia*, of which I have seen both sexes, is there a sexual difference of colour, and I have little doubt that the male in question is distinct from *tricolor*, and also from the other named *Emenadiæ*. In Mr. Masters' Catalogue, "South and W. Australia," is cited as the habitat of *E. tricolor*, but I notice that Gerstäcker gives the habitat merely as "Nova-Hollandia."

E. Championi, sp. nov. Nigra, capite antice antennis (articulorum parte producta excepta) palpis mandibulis (apice excepto) prothorace (parte discoidali variabili excepta) elytris (basi suturaque anguste infuscatis exceptis) abdominis maculis nonnullis et pedibus (femoribus posticis exceptis) testaceis vel rufis; sat nitida; capite antice subtiliter postice vix manifeste punctulato; prothorace crebre punctulato, supra æquali, lobo mediano ad apicem rotundato, angulis posticis divergentibus; elytris fere æqualibus, ad apicem acutissimis fere spiniformibus, crebre minus fortiter punctulatis. Long., 3 l.; lat., 1 l.

The most striking character of this insect is the absence of the longitudinal impression that is so conspicuous on the elytra of (at any rate most of) its Australian congeners. In colouring (which, however, is probably variable) it resembles the W. Australian species that Mr. Champion calls "*luteipennis*, Macl. ?" but differs from it (judging from the description) *inter alia* by the much closer puncturation of its prothorax and elytra.

S. Australia.

E. capito, sp. nov. Nigra, capite (parte inter labrum et antennas excepta) mandibulis basin versus antennarum basi palpis prothorace elytris tibiarum spinis tarsorumque unguiculis ferrugineo-rufis ; capite antice subtilius (postice vix manifeste) punctulato ; prothorace supra sat æquali, sat fortiter crebre (sed basin versus mediam multo minus crebre) punctulato, lobo mediano postice truncato, angulis posticis leviter divergentibus ; elytris in disco longitudinaliter impressis, sat fortiter crebre (antice vix minus crebre) punctulatis. Long., $4\frac{1}{2}$ l. ; lat., $1\frac{1}{2}$ l.

The colouring of the two examples that I have seen of this species may be briefly characterised as entirely ferruginous red above, including the hind half of the head, and entirely black beneath, the only exception being the palpi, the base of the antennæ, the apical spines of the tibiæ, and the claws ferruginous, the front half the head black and some of the tarsal joints inclining to piceous. I have no doubt but that the colouring of the head is a reliable character, in which case this insect needs distinguishing only according to the tabulation (above), but it may be added that it differs also from *E. Championi*, Blackb., by the presence of a well-defined discal impression on the elytra, from *luteipennis*, Champ. (? Macl.), by the close puncturation of its elytra, and that the difference in the colouring of almost every part from that of *tricolor*, Gerst. far surpasses the limits of probable variation. (Unfortunately Gerstäcker's description is scarcely precise enough to allow a minute comparison of structural characters.) If there should turn out to be a black-headed form of this species it would come nearest to *diversiceps* and *sobrina*, from the former of which it differs *inter alia* by the lateral margin of its elytra very much more strongly sinuate behind the shoulder, and from the latter by the evident divergence of the prothoracic hind angles, and the much less close puncturation of its prothorax.

Victoria.

E. punctulaticeps, sp. nov. Tota nigra, oris membris plus minusve piceis vel rufescentibus exceptis ; minus nitida ; supra (capite incluso) crebre subfortiter (fere ut *E. sobrina*, Waterh.) punctulata, puncturis sat elongatis ; elytrorum disco longitudinaliter impresso.

Var. ? Elytris in parte antica dimidia (basi summa excepta) fulvis. Long., 3—5½ l.; lat., 1—2 l.

This species is very easily recognised by its closely and asperately punctured head (which is even more closely and asperately punctured in the front part than on the vertex.) Its prothorax is considerably more dilated at the base than that of *E. sobrina*, Waterh., with the hind angles notably more divergent. The puncturation of the prothorax and elytra is as in *E. sobrina*, Waterh. In respect of colouring, the unicolorous antennæ and entirely black elytra seem to form a reliable distinction from most others of the genus. The "var. ?" mentioned above does not seem to differ from the type except in the presence of fulvous colouring on the elytra.

Southern Australia (widely distributed).

E. interioris, sp. nov. Nigra, capite antice antennarum basi palpis mandibulis (ad basin) prothorace (magna ex parte) elytris (postice et ad latera) sterna (maculatim) et abdomine rufis ; modice nitida ; capite antice aspere creberrime (postice minus confertim nec aspere) fortius punctulato ; prothorace supra sat æquali, confertim (a basi antrorsum gradatim magis subtiliter) punctulato, lobo mediano postice anguste rotundato, angulis posticis divergentibus ; elytris in disco longitudinaliter impressis, sat fortiter (antice sparsius, retrorsum gradatim magis confertim) punctulatis. Long., 6 l. ; lat., 2 l.

The red colour of the front part of the head in combination with the strong puncturation of the whole of that segment and the narrowly rounded sub-acuminate apex of the basal lobe of the prothorax distinguishes this species from all its previously described Australian congeners. The black mark on the prothorax is probably variable ; in the type it occupies the greater part of the segment, and is trilobed in front (the lobes not quite reaching the front margin, and having their apices so connected together as to enclose two red spots), and bilobed behind (the lobes not reaching the base). The elytra may be described as being red, with on each of them a somewhat triangular elongate black spot which has it base on the base of the elytra, its apex a little beyond the middle, and touches the suture for a greater distance than it does the lateral margin.

In colouring &c., *E. interioris* bears a rough resemblance to the description of *E. maculicollis*, Bohem., but is no doubt very distinct from that species (which is said, *inter alia*, to have the apex of its prothoracic lobe emarginate, and its head "subtiliter punctulatum.") From *E. punctulaticeps* it differs, apart from colour, chiefly by the notably less close puncturation of the hind

part of its head and the front part of its elytra,—the *prothoracic* puncturation being very similar in the two species.

Central Australia.

RHIPIDIUS.

The species described below may be referred, I think, to this genus, which has not been hitherto recorded as occurring in Australia, although it appears to be widely distributed, species being known from Europe and South Africa. I regret that I have not one of those species before me for comparison, but, nevertheless, I feel confident in the present identification, as the characters of the insect concerned agree quite satisfactorily with those attributed to *Rhipidius* by M. Lacordaire, with the single exception that the claws are scarcely to be called "simple" in the strict sense (inasmuch as the basal portion is somewhat strongly compressed), and would be more accurately described as subappendiculate. This, however, is not a discrepancy that would justify the creation of a new generic name. I should add, however, that as I have only a single specimen I have not been able to investigate characters that cannot be observed without dissection. As the genus is new to Australia it will be well to mention its distinctive characters, as follows:—Elytra extremely short (scarcely surpassing the base of the abdomen) and very widely separated from each other (the interval between them at their base being about as wide as the head); maxillary palpi wanting; head small and globular, the greater part of its surface being occupied by the strongly granulated eyes (which are almost contiguous); antennæ contiguous at their base, their basal 3-joints short, the other 8-joints produced into long rami; legs stout and hairy, the tibiæ dilated towards the apex which is devoid of spines, the tarsi heteromerous and short with small sub-appendiculate claws; scutellum large and transverse.

This insect is probably parasitic upon *Diptera*, as I found it crawling over some dead blow-flies.

R. Australasiæ, sp. nov. Mas. Obscure brunneus, pedibus dilutioribus, capite nigro; hoc crebre subaspere punctulato; prothorace nitido, leviter transverso, antrorsum angustato, subtilissime punctulato, angulis posticis acutis extrorsum directis; elytris opacis, postice acutis, confertim sat aspere punctulatis; antennarum articulo 3° extrorsum fortiter dentiformi. Long., 2 l.

S. Australia; Eyre's Peninsula.

CANTHARIDÆ.

ZONITIS.

I have recently made an attempt to determine the species of this genus in my own collection and that of the S.A. Museum.

The task presents much difficulty on account of the unsatisfactory character of many of the earlier descriptions of species. The *generic* determination, moreover, of many of the described species belonging, or near, to *Zonitis* is a matter of the utmost difficulty. The following genera have been recorded as Australian—*Cantharis*, *Palæstra*, *Tmesidera*, *Zonitis*, *Palæstrida*. *Cantharis posticalis*, Fairm., might be confidently supposed to be distinct from *Zonitis*, but I have a species from Northern Australia which agrees remarkably well with the specific description of that insect, and it is undoubtedly a *Zonitis*. If *C. posticalis* should prove to be a *Zonitis*, *Cantharis* would disappear from our catalogue. *Palæstra* is a good genus, distinguished from *Zonitis* by the dilated and compressed form of its antennal joints, &c. *Tmesidera* is almost certainly identical with *Palæstra*, and is a later name; but of its *species*, only the type (*T. rufipennis*, Westw.) and *assimilis*, Hope, appear to be *Palæstræ*, the other two species attributed to the genus *Tmesidera*, by Hope, being in reality species of *Zonitis*. *Palæstrida* is, I should say, certainly inseparable from *Palæstra*.

The genus *Zonitis* I regard, then, as including (besides the species that have been attributed to it by their authors) two of the *Tmesideræ*, and possibly *Cantharis posticalis*, Fairm. In 1880 M. Fairmaire published (Stett. Ent. Z., pp. 261, &c.) a monograph of the genera *Zonitis*, *Tmesidera*, and *Palæstra*, quoting the exact words of the description of species he had not seen, and adding numerous new species; and since that time, so far as I know, nothing further has been published concerning the Australian species of *Zonitis* and its allies, except isolated descriptions of additional species.

This seems like an exceptionally favorable condition for a group of *Coleoptera* but, unfortunately, there are few other groups containing so large a proportion of descriptions that are incapable of identification with any particular insect (without examination of the types), and, moreover, M. Fairmaire's work is exceedingly difficult to follow out to any satisfactory result; thus, without *tabulating* the species, he arranges them in groups, but in many instances the detailed descriptions are inconsistent with those of the groups. For example, in Group VIII. the first sub-group is characterised as follows:—"Abdomen rufum, femoribus rufis," and of the species associated together under that heading the first is described in detail as having the abdomen red, but it is implied that the legs are *black;* the description of the second is simply a quotation from Blessig, which thus describes the legs —"beine schwartzblau;" the third is stated to have a variety with black legs; and only the fourth (and last) is described as definitely characterised by its red femora. Then, further, M.

Fairmaire has distributed among his groups numerous species which he definitely states are unknown to him, and the descriptions of which contain no hint as to the presence of the characters on the assumed presence of which M. Fairmaire assigns them their place. And again the head of *Z. limbipennis* is characterised in the description of that species as "rufo-testaceous," and a note at the end of the description says—"This species is easy to recognise by its black head."

As I have recently had occasion, for the purpose indicated above, to go carefully through all the literature bearing upon *Zonitis* and ascertain which of the descriptions are capable of identification with any particular insect, and which are mere brief indications of colour, or of two or three differences from some other insect, it seems desirable to put the results on record for the use of other workers, and to add a tabular statement of the characters that I have found available for identifying those species which are known to me either through intelligible description or inspection of types.

The names that have been attributed to *Zonitis* by M. Fairmaire or subsequently by their authors, together with Mr. Hope's two *Tmesideræ* are, I think, 42 in number. Of these, I think, I can definitely state that two are synonyms,—viz., *Z. æneiventris*, Redt. = *tricolor*, Le Guillou and *Z. ventralis*, Fairm. = *rostrata*, Blessig. The former of these instances of synonym is asserted, and the latter suspected, by Fairmaire. Of the remaining 40 names the following four are attached to descriptions in which not a single valuable character is mentioned (apart from colour, and this is too variable in at least *many* species of *Zonitis* to be of value when standing alone, at any rate when the colours are not very unusual), viz., *annulata*, Macl. ; *apicalis*, Macl. ; *fuscicornis*, Macl. ; *rubricollis*, Hope. The following eleven names represent species, the descriptions of which are more detailed than those of the four just mentioned, but, which for the reasons assigned below, I have been unable to place in a tabulation. They are as follows :—

Z. pallida, Macl. Probably near *Cowleyi*, Blackb. (described below). The description states that the under-surface is black, and does not mention the palpi as being particularly long, or the eyes as being approximate above, two remarkable characters that the author could hardly have failed to notice. Moreover, the elytra are said to have three obsolete longitudinal lines, so I presume it is distinct from *Cowleyi*. The absence of information concerning the structure of the antennæ excludes this species from my tabulation.

Z. cylindracea, Fairm. Some remarks on this species will be found below under the heading of *Z. yorkensis*. The ambiguity

of the description of the antennal structure prevents my assigning this insect a place in my tabulation.

Z. flaviceps, Waterh. This is evidently a very distinct species, described as having strongly punctured black elytra narrowly flavo-piceous at the base and sides. The absence of information concerning its antennæ obliges me to omit it from my tabulation.

Z. limbipennis, Fairm. As noted below, the head of this insect is described as flavo-testaceous, and a note following the description states that it is easily recognisable by its *black* head. It is from the same locality (Swan R.) as *flaviceps*, and if its head is flavo-testaceous, is similarly coloured, but seems to have closer and finer elytral puncturation.

Z. flavicrus, Fairm. The antennæ of this species are not described. It appears to be near *rugosipennis*, Fairm., but to have the *foveæ* of its prothorax different, and a slight difference in colour. I suspect it of being a variety,—*rugosipennis* being, according to its author, variable in colouring ; indeed, a note states that *flavicrus* differs from *rugosipennis* by its testaceous femora, and yet both species are grouped as having red femora.

Z. rugata, Fairm. The description of the antennæ is too vague to be used in tabulation. As the type is stated to be immature, it is difficult to form any clear conception of its characters.

Z. semirufa, Fairm. I have not included this species in my tabulation because I cannot find any character whereby to distinguish it from *rostrata*, Blessig., except in the colour and the prothoracic foveæ (which do not seem to me reliable).

Z. indagacea, Fairm. The description gives the second joint of the antennæ longer than the third, while an appended note distinguishes it from *nigro-œnea*, Fairm., by the second joint being " notably *shorter* than the third."

Z. janthinipennis, Fairm. Not described ; merely briefly compared with *indagacea*, without any reference to the comparative length of the antennal joints.

Z. nigro-œnea, Fairm. The description does not mention the comparative length of the second and third antennal joints. If the second joint is considerably shorter than the third it is probably identical with *violaceipennis*, Waterh., of which I have examples. In that case Mr. Waterhouse's name becomes a synonym.

Z. (Tmesidera) violacea, Hope. The structure of the antennæ is not described. Evidently very near to *violaceipennis*, Waterh., but differently coloured in respect of the under-surface and legs. If it is a mere variety of the latter, the name has priority.

After eliminating the above there remain 25 names as representing the species that up to this time have been described in a fashion that will allow of their being confidently identified and their characters arranged in a tabular form. I now add seven

new names, including a new name that I propose for an insect previously described as a " var. (?) "—and furnish a tabulation of the characters of the 32 species thus regarded as recognisable members of the genus. As it seems undesirable to altogether leave out the 15 species that are not satisfactorily described, I have drawn up a supplementary tabulation of them founded upon such characters as their authors have mentioned, which will, perhaps, assist in their identification. I have been unable in the case of one of them [*Z. (Tmesidera) rubricollis*, Hope], however, to place it even in the supplementary tabulation owing to there being no precise description of either the structure of its antennæ or the sculpture of its elytra.

A. Joint 2 of antennæ not notably shorter than 3 (see note in the description of *Z. Cowleyi*, Blackb.).
  B. Elytra not of uniform metallic colouring.
    C. Head not black.
      D. Base (at least) of elytra testaceous.
        E. Legs unicolorous, or nearly so.
          F. Scutellum black.
            G. Elytra black at apex... ... *Andersoni*, Blackb.
            GG. Elytra entirely testaceous ... *dichroa*, Germ.
          FF. Scutellum testaceous.
            G. Head of short triangular form... *tenuicornis*, Fairm.
            GG. Head more elongate.
              H. Eyes almost contiguous ... *Cowleyi*, Blackb.
              HH. Eyes normally distant from each other ... ... *lutea*, Macl.
        EE. Legs not unicolorous.
          F. Elytra with black markings.
            G. Elytra very closely punctulate *nigro apicata*, Fairm.
            GG. Elytra sparsely punctulate ... *nigroplagiata*, Fairm.
          FF. Elytra devoid of black markings.
            G. Elytra much less closely punctured near base than behind *tricolor*, Le Guill.
            GG. Elytra uniformly punctured.
              H. Prothorax rather closely punctured (size about 5 l.) *pallicolor*, Fairm.
              HH. Prothorax thinly punctured (size about 2½ l.) ... *obscuripes*, Fairm.
      DD. Base of elytra black ... ... *bizonata*, Macl.
    CC. Head black.
      D. Prothorax and scutellum black ... *opacorufa*, Fairm.
      DD. Prothorax and scutellum ochraceous yellow ... ... *seminigra*, Fairm.
  BB. Elytra uniformly metallic in color.
    C. Head comparatively short.
      D. Prothorax black ... ... *splendida*, Fairm.
      DD. Prothorax testaceous or rufo-testaceous ... ... *brevicornis*, Blackb.
    CC. Head extremely elongate ... ... *gloriosa*, Blackb.
AA. Joint 2 of antennæ notably shorter than 3.
  B. Puncturation of elytra not coarsely vermiculate-rugulose.
    C. Interval between the eyes at least as great as length of basal joint of antennæ.

D. Elytra extremely closely (about as closely as in *Z. tricolor*) sculptured.
E. Antennæ not conspicuously more slender thaa in the generality of *Zonites*.
F. Eyes transverse or nearly so.
G. Prothorax nitid ... ... *Murrayi*, Blackb.
GG. Prothorax opaque, owing to close rugulosity ... ... *subrugata*, Blackb.
FF. Eyes very oblique (sublongitudinal).
G. Prothorax closely and somewhat strongly punctulate... . *rustica*, Blackb.
GG. Prothorax very finely and very sparsely punctulate ... *cyanipennis*, Waterh.
EE. Antennæ extremely slender ... *Helmsi*, Blackb.
DD. Elytra very much less closely punctulate.
E. Surface of head with a large concave area reaching hindward behind the level of the back of the eyes.
F. Eyes very large. (Head black)... *queenslandica*, Blackb.
FF. Eyes small, like those of *Z. tricolor*. (Head rufo-testaceous) ... ... *bipartita*, Fairm.
EE. Surface of head not having a large concave area.
F. Maxillary palpi very long (as long as the basal 3-joints of the antennæ together) ... ... *longipalpis*, Blackb.
F. Maxillary palpi normal ... *yorkensis*, Blackb.
CC. Interval between the eyes less than length of basal joint of antennæ ... *Carpentariæ*, Blackb.
BB. Puncturation of elytra coarsely vermiculate rugulose.
C. Head closely rugulose.
D. Prothorax moderately narrow in front (not narrower than in *cyanipennis*, Waterh.) ... ... *rugosipennis*, Fairm.
DD. Prothorax extremely narrow in front (less than half as wide as the base of the head) ... ... *aspericeps*, Blackb.
CC. Head thinly and feebly punctulate, not at all rugulose.
D. Prothorax red ... ... *rostrata*, Blessig.
DD. Prothorax black or metallic.
E. The underside black.
F. The median channel of prothorax continuously well-defined to base *violaceipennis*, Waterh.
FF. The median channel of prothorax well defined only for a short distance in middle of the segment ... ... *Sedilloti*, Fairm.
EE. The underside brilliantly metallic *purpureipennis*, Waterh.

Supplementary tabulation of *Zonites* that for want of information on the antennal characters could not be included in the preceding tabulation.

A. Elytra not coarsely rugulose.
  B. Elytra entirely or for most part testaceous or rufo-testaceous.
    C. Head testaceous.
      D. Legs not black.
        E. Elytra closely punctulate.
          F. Elytra unicolorous ... ... *fuscicornis*, Macl.
          FF. Elytra brown about base and apex *annulata*, Macl.
        EE. Elytra thinly punctulate... ... *apicalis*, Macl.
      DD. Legs black ... ... *pallida*, Macl.
    CC. Head black ... ... *cylindracea*, Fairm.
  BB. Elytra black, narrowly bordered with testaceous.
    C. Elytra strongly punctulate ... ... *flaviceps*, Waterh.
    CC. Elytra very finely punctulate ... *limbipennis*, Fairm.
AA. Elytra coarsely rugulose.
  B. Prothorax testaceous or rufo-testaceous.
    C. Under-surface black.
      D. Prothorax strongly canaliculate ... *flavicrus*, Fairm.
      DD. Prothorax feebly and interruptedly canaliculate ... ... *rugata*, Fairm.
    CC. Under-surface rufo-testaceous ... *semirufa*, Fairm.
  BB. Prothorax black.
    C. Under-surface black.
      D. Prothorax 3-foveolate on each side ... *indagacea*, Fairm.
      DD. Prothorax with less than 3 foveæ on each side.
        E. Prothorax strongly canaliculate ... *nigro-ænea*, Fairm.
        EE. Prothorax very feebly canaliculate *fanthinipennis*, Fairm.
    CC. Under-surface red ... ... *violacea*, Hope.

Z. Cowleyi, sp. nov. Testacea, antennis palpis pedibusque (femoribus ad basin exceptis) infuscatis; minus nitida; capite valde elongato antice anguste rostriformi (labro quam latiori multo longiori), sparsius subfortiter punctulato, inter oculos longitudinaliter canaliculato; palpis maxillaribus valde elongatis (quam antennarum articuli basales 3 conjuncti vix brevioribus), articulo apicali gracili apicem versus parum incrassato; antennis exempli typici fractis, articulo 2° quam 1us vix breviori; oculis permagnis, supra et subtus subcontiguis; prothorace quam (ad basin) latiori parum longiori, a basi ad apicem arcuatim angustato supra sat æquali, fere ut caput punctulato sed paullo magis crebre; elytris breviter pubescentibus confertim subtiliter punctulatis, lineis elevatis haud instructis. Long., $6\frac{1}{4}$ l.; lat., $1\frac{3}{5}$ l.

The head of this species is so peculiar as to suggest a question whether it might not be regarded as generically distinct from *Zonitis*, but most of the characters seem to be only exaggerations of what is to be found in other species of the genus. The head is not much longer (though it is narrower and more rostriform in front) than that of *Z. rostrata*, Blessig. The eyes are much larger than in any other *Zonitis* that I have seen, and the maxillary palpi much longer than in any other except longipalpis

(described below). I cannot find any other character at all suggestive of generic difference from *Zonitis*, of which it has completely the facies. It should be noted that only two joints of an antenna remain in the unique type, so that I am not absolutely certain of the second joint being not much shorter than the third, but as the second joint is scarcely shorter than the basal one there is no likelihood of its being much shorter than the third.

Tropical Queensland ; taken by Mr. Cowley.

Z. subrugata, sp. nov. Sat brevis ; minus angusta ; obscure rufa, elytris obscure viridibus submetallicis, capite tibiis tarsisque picescentibus ; minus nitida ; capite modice elongato, antice minus angustato (labro leviter transverso, antice truncato), dupliciter (subtiliter et rugulose sat grosse) confertim punctulato ; antennarum articulo 2° quam 3us tertia parte breviori ; oculis modicis sat transversis ; prothorace quam latiori parum longiori, antice sat angustato, ut caput punctulato, pone medium longitudinaliter breviter canaliculato, sat inæquali (ante medium bifoveolato), lateribus pone medium sat parallelis ante medium antrorsum arcuatim convergentibus, angulis anticis nullis ; elytris confertim nec grosse rugulosis, lineis elevatis nullo modo perspicuis. Long., 5 l.; lat., 2 l.

The head and prothorax are subopaque owing to the presence of close fine puncturation, among which is thinly intermingled a number of feebly impressed somewhat coarse punctures. The elytral puncturation is not unlike that of *Z. tricolor*, but is very evidently less fine and more asperate. This species in many respects corresponds with the description of *Z. rugata*, Fairm. (of which its author says he has seen only examples probably immature), but I do not think it can be that species, as its elytra are described as " rugose-vermiculate with the interstices sparsely punctulate," which does not at all fit the present insect, which also differs from the description in having the undersurface (not black but) red, an improbable variation if the type was immature ; also in the elytra not being acuminate behind, the prothorax having two very well defined round foveæ in front of the middle, &c.

Australia ; exact locality uncertain, but probably S.A.

Z queenslandica, sp. nov. Anguste subcylindrica ; testacea, capite palpis antennis pedibusque (coxis femorumque basi anticis exceptis) nigro-piceis, corpore subtus maculatim infuscato, elytris apicem versus externe piceis ; sat nitida ; capite sat elongato (labro transverso antice subtruncato), antice (ut *Z. bipartitæ*, Fairm.) leviter concavo (area concava

postice rotundata bene definita) ; antennarum articulo 2° brevissimo ; oculis magnis subtransversis ; prothorace quam latiori paullo longiori, antice modice angustato, supra sat æquali, sparsim subtiliter punctulato, lateribus leviter arcuatis, latitudine majori paullo pone medium posita ; elytris subcrebre minus subtiliter punctulatis, lineis nonnullis subelevatis vix manifeste instructis. Long., 6 l.; lat., $1\frac{2}{5}$ l.

The most elongate and cylindric species known to me of the genus. Its form seems to forbid any possibility of identity with *Z. apicalis*, Macl., which is described as having elytra "subdepressed, broad, and broadest at the apex," but seems to bear a considerable resemblance to this insect in colouring, though differing by its testaceous head. This insect also resembles *Z. bipartita*, Fairm., but differs from it *inter alia* by its black head, third joint of antennæ much longer in proportion to the second, even surface of prothorax, much closer and distinct puncturation of elytra, much longer and narrower form, and the better defined concave area on the head, which has its hind margin much more sharply defined.

Queensland.

Z. longipalpis, sp. nov. Minus elongata, minus angusta ; nigro picea, mandibulis prothorace elytris tarsorum posticorum basi summa et unguiculis flavis ; sat nitida ; capite fortiter elongato antice angustato (labro quam latiori longiori), sparsim punctulato, antice minus sparsim ; antennarum articulo 3° quam 2us tertia parte longiori ; oculis sat magnis sat transversis, supra interspatio lato separatis, palpis maxillaribus valde elongatis (quam antennarum articuli basales 3 conjuncti sublongioribus) ; prothorace quam latiori paullo longiori, antice sat fortiter angustato, sparsissime punctulato, foveolis antice 2 postice 1 impressis, haud canaliculato, lateribus a medio antrorsum fortiter sinuatim (retrorsum leviter sat recte) convergentibus, angulis anticis distinctis ; elytris leviter sparsius indeterminate punctulatis vix subrugulosis, lineis subelevatis 3 manifeste instructis. Long., 5 l.; lat., $1\frac{2}{5}$ l.

This species may be distinguished from the other Australian *Zonites* known to me, except *Z. Cowleyi*, Blackb., by the great length of its maxillary palpi. From *Z. Cowleyi* it differs widely by *inter alia* the very much shorter second joint of its antennæ, and the very much less defined sculpture of its elytra. The number and arrangement of the impressions on its prothorax are peculiar, but I do not feel confident that these present very reliable specific distinctions in the *Zonites*.

S. Australia (Hawker district). In the S.A. Museum.

Z. yorkensis, sp. nov. Elongata, subcylindrica ; nigra, elytris et (nonnullorum exemplorum) prothorace aliqua ex parte rufis ; sat nitida ; capite sat elongato, antice minus angustato (labro transverso), antice sparsim vix subtiliter (postice sparsissime) punctulato, vertice manifeste canaliculato ; antennarum articulo 3° quam 2us circiter duplo longiori ; oculis modicis quam *Z. tricoloris* magis oblique positis ; prothorace quam latiori paullo longiori, antice minus angustato, sparsissime punctulato, pone medium longitudinaliter breviter canaliculato, utrinque foveolis nonnullis plus minusve fortiter impresso, lateribus pone medium sat parallelis ante medium antrorsum arcuatim convergentibus, angulis anticis nullis ; elytris sparsius leviter minus subtiliter punctulatis, lineis subelevatis 3 vel 4 vix perspicue instructis. Long., 5 l.; lat., $1\frac{1}{2}$ l.

A narrow cylindric species near *cylindracea*, Fairm., but I think it can hardly be that species, chiefly because the latter is described as having antennæ, the second joint of which is "distincte" shorter than the third, whereas in this species it is not more than half the length of the third (in other species with a second joint as short M. Fairemaire uses the term "multo brevior") · because the prothorax is said to be non canaliculate ; because the elytra are described as having three somewhat elevated lines, the intervals between which are "sat fortiter punctata" and "tenuiter rugosula," with which the elytra of this insect by no means correspond ; and because the head is said to be "sat dense punctatum," and impressed in an oblong form between the antennæ, while in *Z. yorkensis* the head is *sparsely* (though not very finely) punctulate (very much more sparsely than in *opaco-rufa*, Fairm., with which its author compares *cylindracea* without mentioning a difference in the puncturation of the head), and has nothing of the nature of an oblong impression occupying the space between the bases of the antennæ ; but that space is somewhat vaguely uneven in its middle part, with a short furrow on either side close to the base of the antennæ. It may be added, moreover, that *Z. cylindracea* is said to be from Richmond R. district, N.S.W., a region certainly having very few species in common with the locality of *Z. yorkensis*.

S.A. (Yorke's Peninsula).

Z. Carpentariæ, sp. nov. Angusta, cylindrica ; testacea, palpis labro mandibulis ad apicem antennis tibiis tarsis et (basi excepta) elytris nigro-piceis ; sat nitida ; capite valde elongato sparsim subtilius punctulato, lateribus ante oculos sat parallelis (labro leviter transverso) ; antennarum articulo 3° quam 2us duplo longiori ; oculis sat magnis sat transversis

(inter hos interspatio supra quam antennarum articuli basalis longitudo haud latiori); prothorace quam latiori ut $1\frac{3}{5}$ ad 1 longiori, antice valde angustato, subtilissime (vix perspicue) punctulato, subtiliter canaliculato, utrinque pone medium fovea leviter impresso, lateribus pone medium sat parallelis ante medium sat fortiter sinuatis, angulis anticis (superne visis) obtusis; elytris subtilissime crebre ruguloso-punctulatis, lineis subelevatis vix perspicuis. Long., $4\frac{1}{2}$ l.; lat., $1\frac{2}{5}$ l.

A very distinct species, most readily recognisable perhaps by the space between the eyes on the upper surface (at any rate in one sex—probably in both sexes) being scarcely as wide as the length of the basal joint of the antennæ. This results from the narrowness of the head rather than the eyes being particularly large. The prothorax, also, is unusually narrow and elongate.

Tropical Queensland; given to me by Mr. Koebele.

Z. aspericeps, sp. nov. I propose this name for a *Zonitis* which I described (Tr. Roy. Soc., S.A., XII., p. 141) as "var (?) A" of *nigro-œnea*, Fairm. It is quite distinct from *nigro-œnea* by *inter alia* the rugulose and much closer puncturation of its head.

PALÆSTRA.

In the only two species (of this genus) of which I know both sexes, the male is very much smaller than the female, and has much longer antennæ, their joints only slightly dilated. Seven names have been applied to members of this genus, but three of them seem to be certainly synonyms, partly through the non-recognition of the fact that the difference in the length and dilatation of the antennæ is sexual. The names, I think, should stand as follows:—

1. rufipennis, Cast.
   rufipennis (Tmesidera), Westw.
   quadrifoveata, Fairm. (Mas.).
2. eucera, Fairm.
3. assimilis (Tmesidera), Hope.
   platycera, Fairm.
4. rufocincta, Fairm.

GOETYMES.

G. pictipes, sp. nov. Niger, labro antennis (harum laminis apicem versus obscuris) tibiis tarsisque flavis, elytris (apice nigro excepto) pallide brunneis; setulis brevibus erectis in capite prothorace que crebre vestitus; capite crebre subfortiter punctulato; prothorace transverso, canaliculato, subinæquali, subtiliter sat crebre punctulato, antice abrupte angustato, lateribus rectis, basi lobato; scutello elongato canaliculato; elytris costatis, fere ut prothorax punctulatis. Long., $5\frac{1}{2}$ l.—6 l.

I have seen only two specimens of this insect, and I take them to be males. The antennæ are structurally quite as Mr. Pascoe describes those of *G. flavicornis*. The present species *inter alia* differs so entirely in colour from the earlier one, and is so much smaller (only about half the size) that there can be no fear of confusing them.

Victoria ; on the sea beach near Melbourne (Mr. French).

ŒDEMERIDÆ.

I have recently been overhauling the *Œdemeridæ* in the South Australian Museum and in my own collection, and find many undescribed species. There is great difficulty in apportioning them generically, as considerable confusion seems to exist regarding the names of some of the genera, and much alteration has taken place during recent years. For example, in Cist Ent. II., p. 228, Mr. Waterhouse described two Tasmanian species under the generic name *Sessinia* ; in Trans. Ent. Soc., 1895, Mr. Champion placed them in *Asclera* ; in the Catalogue of *Œdemeridæ*, recently published by the same author (Ann. Soc. Ent., Belg., XLIII., pp. 55 and 56) they appear under the name *Ischnomera*, *Asclera* being dropped. The type of *Ischnomera* is stated by Lacordaire to be *I. melanura*, Linn., but as that species is far, indeed, generically from the Tasmanian species mentioned above it is to be supposed that Mr. Champion has discovered *melanura* not to be the real type of *Ischnomera*. Mr. Champion's Catalogue of *Œdemeridæ* including only recently described species, it is of course impossible to ascertain from it to what genus he regards *melanura* as really belonging, but it is probable that he would place it in *Nacerdes*, in which Lacordaire placed it (treating *Ischnomera* as a synonym of *Nacerdes*, which Mr. Champion, no doubt, has found to have been error).

Scarcely any of the Australian *Œdemeridæ* are now referred to the genera in which they stand in Mr. Masters' Catalogue. *Selenopalpus* appears to rest upon Sir W. Macleay's very hesitating reference to it of his *S.* (?) *fuscus* and *S. Mastersi* ; the other species (*cyaneus*, Fab.) having been called *Œdemera* by its author (it has been called also *Lagria* and *Dryops*.) I should say that Sir W. Macleay's species are perhaps not *Œdemeridæ*, as their author, in his description, says "neck large," and the description of the prothorax of *fuscus* does not read like that of a member of the family. Why he refers the species to *Selenopalpus* it is difficult to discover, as he says "they do not answer exactly to the description given of the maxillary palpi of *Selenopalpus*, and as far as I can ascertain no other characters have been given for that genus." Fabricius' species is certainly, I think, not recognisable unless the type could be examined, especially as Olivier's later description does not agree with that of Fabricius.

Ananca (to which most of the remaining described *Œdemeridæ* have been attributed) is now stated by Mr. Champion to be an insufficiently characterised genus, most of the species of which belong to *Copidita* or *Oxacis*. *Sessinia* (accidently omitted from Masters' Catalogue) is dismissed on the same grounds as *Ananca* and its Australian species, as noted above, are referred to *Ischnomera*. *Ischnomera mansueta*, Newm. (the only one of the genus enumerated in Master's Cat.) is from its description evidently not congeneric with the species now placed in *Ischnomera*. Of the Australian genera added since Mr. Masters' Cat. was published, *Ithaca* is stated to be identical with *Dohrnia*; *Trichananca*—as stated below, is perhaps not an *Œdemerid*, and *Pseudananca* was described as an extremely anomalous form whose place in the *Œdemeridæ* is doubtful. This leaves only *Pseudolycus* and *Dohrnia* of Masters' Cat. unchanged, and there have since been added (most of them including species enumerated under other names by Mr. Masters) *Copidita*, *Ischnomera*, and *Techmessa*. As the insect which Lacordaire calls *Nacerdes melanura*, Linn., occurs in Australia (imported, no doubt) and is certainly not a member of any of the genera I have mentioned above as now admitted to be Australian, *N. acerdes* must be added.

Unfortunately, I do not find that the Australian *Œdemeridæ* before me can be satisfactorily placed in so small a number of genera as the six above enumerated. I have tried to apportion the specimens generically by means of Mr. Horn's paper on the *Œdemeridæ* of N. America (in Proc. Calif. Acad. of Sci., 1896) but I find in it such serious discrepancies in the treatment of genera with Mr. Champion's views that it does not seem safe to follow him. For example, he says that almost the only difference between *Copidita* and *Asclera* consists in the claws of the former being simple while those of the latter are toothed, and intimates that he considers it a scarcely sufficient distinction for treating them as two genera. But in this he differs from Lacordaire, who makes the claws of *Asclera* simple. In examples of the European *A. cærulea*, Linn., in my collection the claws are not *absolutely* simple (as they are in *e.g. Copidita 4-maculata*, Motsch , of which I have specimens before me), but "toothed" certainly seems to me scarcely the term to describe their structure ; I should call them "appendiculate." Mr. Champion, however (*loc. cit.*) places in *Asclera* species (*e.g. sublineata*, Waterh.) which have simple claws, and distinguishes the genus from *Copidita* by its finely granulated eyes.

In the face of all these difficulties it would evidently be undesirable for me, at present, to found new genera for the Australian *Œdemeridæ* that do not satisfactorily fit into the six

genera enumerated above, and it would be misleading to refer them without qualification to those genera. I therefore adopt the expedient of furnishing the following table, which will enable the student to determine with ease the genus to which I should refer any specimen that might be under observation, and at the same time will indicate which of the species I describe are not typical representatives of the genera in which I place them. The species of this non-typical description are for the most part allied to *Copidita* and *Oxacis* by their principal characters rather than to any other genera, and it is worthy of note that the characters distinguishing them from *Copidita* and *Oxacis* are in most cases characters that Mr. Horn regards (*loc. cit.*) as not involving generic distinction from *Copidita* and *Oxacis* although exceptional in those genera. I may say however that I do not share this opinion with Mr. Horn, and that I am deterred from founding new genera on those characters only by the uncertainty that prevails (or at any rate has lately prevailed even if Mr. Champion's recent Catalogue can be regarded as final on the subject) as to what are the real types of some of the older genera.

I should add that *Pseudolycus apicalis*, Macl. (of which I have an example compared with the type) is certainly not a member of any of the genera mentioned in the following table. I doubt its being an *Œdemerid*, judging from such examination as is practicable without damaging my unique example, and incline to think it a *Pyrochroid*. I may remark in passing that M. Lacordaire's diagnosis of the *Pyrochroidæ* differs very little from that of the *Œdemeridæ*, the principal distinctions he gives being that the former has mandibles scarcely passing the apex of the labrum, the head narrowed behind into a neck, antennæ pectinated or flabellated; while in the latter the mandibles are longer, the antennæ simple or with some compressed joints, and the head gradually narrowed behind. *Pseudolycus apicalis* has mandibles reaching considerably beyond the labrum, the head with certainly a little more of a neck than *Pseudolycus*, and the antennæ strongly serrate. Comparing examples of *Pyrochroidæ* and *Œdemeridæ* in my own collection I find that the *Œdemeridæ* have (at least) the apical joint of their tarsi spongiose beneath and their prothorax more or less cordiform (or at least tending towards that shape), neither of which characters can I find in any *Pyrochroid* known to me. *P. apicalis*, Macl., presents neither of these latter characters. In the following table I have included this species and the two doubtful *Œdemerid* genera, and place their names in italics to indicate the uncertainty of their position.

A. Antennæ filiform, more or less slender, and decidedly elongate.
  B. Mandibles bifid at apex.
    C. Two spines at apex of front tibiæ.
      D. Eyes coarsely granulate.
        E. Claws simple.
          F. Apical joint of maxillary palpi about twice as long as penultimate.
            G. Antennæ inserted close to the eyes ... ... Copidita (*typical*).
            GG. Antennæ inserted not close to the eyes... ... ... Copidita (*Sub-section I*).
          FF. Apical joint of maxillary palpi scarcely longer than penultimate ... ... Copidita (*Sub-section II*).
        EE. Claws strongly toothed beneath (sub-bifid) ... ... Copidita (*Sub-section III*).
      DD. Eyes finely granulate. [Schmidt).
        E. Head short, eyes somewhat round Ischnomera (*Asclera*,
        EE. Head more elongate, eyes more oblong ... ... Dohrnia.
    CC. Only one spine at apex of front tibiæ Nacerdes.
  BB. Mandibles simple at apex (eyes coarsely granulate, claws simple, front tibiæ bi-spinose).
    C. Head short .. .. Oxacis (*? typical*).
    CC. Head considerably more elongate.
      D. Eyes gently transverse .. ... Oxacis (*Sub-section I*).
      DD. Eyes strongly longitudinal ... Oxacis (Sub-section II).
AA. Antennæ more robust and considerably shorter.
  B. Eyes coarsely granulate ... ... *Trichananca*.
  BB. Eyes finely granulate .. ... Techmessa.
AAA. Antennæ with intermediate joints more or less compressed in contrast with the others ... ... Pseudolyeus.
AAAA. Antennæ serrate. [Macl.
  B. Size moderate (about 4 l.) ... ... (*Pseudolycus*) *apicalis*,
  BB. Size very small (less than 2 l.) ... *Pseudananca*.

COPIDITA (typical).

C. baldiensis, sp. nov. Angusta, valde elongata ; testacea, capite prothoracis macula utrinque posita et abdominis segmentis posticis 3 nigris, elytris nigro-cyaneis, antennis (harum articulis ultimis 4 apicem versus testaceis) palpis maxillaribus pedibusque (femoribus, apicibus exceptis, testaceis) piceis ; capite parum elongato, minus crebre minus subtiliter punctulato ; palporum maxillarium articulo ultimo elongato-cultriformi ; mandibulis ad apicem bifidis ; antennis gracilibus, articulo ultimo appendiculato ; oculis magnis sat fortiter granulatis ; prothorace pernitido, sparsim subtiliter punctulato, cordiformi, inæquali (antice canaliculato et utrinque foveolato, postice fovea magna mediana impresso, partibus nigris subtuberculiformibus), quam latiori paullo longiori ; scutello crebre subtiliter punctulato ; elytris

pube brevi minus dense vestitis, crebre subtiliter punctulatis, lineis subelevatis 3 obsolete instructis. Long., $4\frac{1}{2}$—6 l.; lat., 1—$1\frac{1}{4}$ l.

A very slender and elongate species, not very close to any other known to me. Resembling in form and structure *C. nigronotata*, Bohem.; its colours and markings are more like those of *australis*, Boisd. (though differing considerably in the black head, yellow scutellum, yellow sterna, piceous tibiæ and tarsi, &c.).

Victoria; Australian Alps (near the summit of Mount Baldi).

C. Kershawi, sp. nov. Sat angusta, sat elongata; testacea, antennarum articulis (ultimo excepto) in parte majori apicali nigris, prothorace (parte basali—in medio antrorsum producta,—excepta) elytris (sutura,—hac fere ad medium late et prope apicem ut fascia lata margines laterales attingenti dilatata—excepta) genubusque nigris, tibiis (plus minusve) et tarsis (articulis apicalibus 2 exceptis) piceis; capite sat elongato, subtilius vix crebre punctulato, in parte postica longitudinaliter canaliculato; palporum maxillarium articulo apicali elongato-cultriformi; mandibulis ad apicem bifidis; antennis sat gracilibus, articulo ultimo appendiculato; oculis magnis sat fortiter granulatis; prothorace pernitido, subtilius sparsius punctulato, subcordiformi, inæquali (postice in medio canaliculato et impresso, antice utrinque fovea lata leviter impresso), quam latiori vix longiori; scutello crebre punctulato; elytris pube brevi sat dense vestitis, confertim sat subtiliter subaspere punctulatis, lineis subelevatis 3 minus perspicue instructis. Long., $4\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

The colours and markings of this species are very different from those of the other described Australian *Copiditæ*. The conspicuous yellow and black variegation of its antennæ is very noticeable. It is, perhaps, nearest structurally to the preceding (*C. baldiensis*), but differs *inter alia* by its head strongly canaliculate in the hinder part, its shorter and wider prothorax, the more crowded and asperate puncturation of its elytra, &c.

Victoria; taken by Mr. Kershaw.

C. Sloanei, sp. nov. Angusta, sat elongata; supra breviter pubescens; testacea, capite palpis antennis abdominis segmentis 3° 4° que pedibusque (femorum basi et tarsorum articulis apicalibus 2 exceptis) piceis vel nigris, elytris piceis vel nigris plus minusve cyanescentibus et testaceo-notatis (scil. macula communi mediana quadrata, et apice summo); capite sat elongato crebrius subtilius punctulato; palporum maxillarium articulo ultimo elongato-cultriformi; mandi-

bulis ad apicem bifidis; antennis gracilibus, articulo ultimo appendiculato; oculis magnis, fortiter granulatis; prothorace sparsim subtiliter punctulato, cordiformi, inæquali (postice in medio, antice utrinque, late leviter impresso), quam latiori paullo longiori; scutello crebre punctulato; elytris confertim sat subtiliter subaspere punctulatis, lineis subelevatis 3 minus perspicue instructis. Long., 4 l.; lat., 1l.

Resembles the preceding (*C. Kershawi*) in style of colouring though differing much in detail (*e.g.*, in its unicolorous antennæ), but widely distinct in colour and markings from all the other described species. Structurally it differs from *C. Kershawi*, *inter alia*, by its much longer and narrower prothorax, and its non-canaliculate head.

Australia; taken by Mr. Sloane (probably in N.S.W.).

C. (?) (*Œdemera*) *bivittata*, Boisd. The brief description of this species reads very much as if it might have been founded on the insect that Mr. Champion has since described as *C. bipartita*, but the question of identity could only be decided by an examination of Boisduval's insect, so for the present it is best to disregard his name.

C. languida, sp. nov. Modice elongata, minus gracilis; breviter pubescens (prothorace glabro excepto); testacea, palporum antennarumque articulis singulis (horum ultimis 4 exceptis) prothoracis utrinque macula lunata, elytris [macula basali parva et vitta communi suturali (hac antice et postice abbreviata, ante et pone medium fasciatim dilatata,—fasciis margines laterales haud attingentibus sed ad apicem ramos longitudinales emittentibus) exceptis] tibiis tarsis abdomineque (his maculatim) et genubus piceis vel nigro piceis; capite modice elongato, confertim subtiliter punctulato; palporum maxillarium articulo ultimo elongato-cultriformi; mandibulis ad apicem bifidis; antennis sat gracilibus, articulo ultimo in medio valde constricto (subdeformi); oculis magnis sat grosse sed leviter granulatis; prothorace pernitido, sparsim subtiliter punctulato, cordiformi, inæquali (postice in medio, antice utrinque, late profunde impresso), quam latiori paullo longiori; scutello crebre subtiliter punctulato; elytris confertim subtiliter punctulatis, lineis subelevatis 3 perspicue instructis. Long., 6 l.; lat., $1\frac{3}{5}$ l.

Resembles *C. Sloanei* somewhat in the style of its colours and markings, though differing considerably in detail. It is considerably larger than that species, with its elytral puncturation very evidently finer, less asperate, the raised lines on its elytra much more defined, its prothorax more strongly cordiform with the inequalities of the surface much deeper, the variegation of

colours on its antennæ much less defined, &c., &c. It differs from all its congeners known to me by the very strong median constriction of the apical joint of its antennæ, and by the feebler, though scarcely less coarse, granulation of its eyes.

Queensland (In the S.A. Museum).

COPIDITA (Sub-section I.).

C. hilaris, sp. nov. Modice elongata, minus angusta; nigra, antennis basin versus subtus (articulis ultimis exempli typici carentibus) prothorace (hoc utrinque apicem versus nigro-gibboso) elytrisque rufis; capite parum elongato, nitido, subtiliter minus crebre punctulato; palporum maxillarium articulo ultimo elongato-cultriformi; mandibulis ad apicem bifidis; antennis gracilibus, articulo apicali appendiculato, parte appendiculata dilutiori; oculis magnis, sat fortiter granulatis; prothorace nitido, fere lævi, cordiformi, inæquali (postice in medio, et antice utrinque, foveolato), quam longiori vix latiori, ad latera antice gibboso; elytris pube sat densa vestitis, confertim subtiliter subaspere punctulatis, lineis subelevatis 3 perspicue instructis. Long., $3\frac{1}{2}$ l.; lat., $1\frac{1}{3}$ l.

An extremely distinct species, not resembling any other known to me in its colouring. Its antennæ inserted not close to the eyes are suggestive of *Chrysanthia*, of which genus it is, perhaps, a member, but I hesitate to place it there on account of its eyes being feebly emarginate, the second joint of its antennæ very short, its general form not exceptionally slender, &c. Mr. Horn includes in *Copidita* species having the antennæ inserted not close to the eyes, so I have good authority for placing the present species (at any rate provisionally) in that genus.

Victoria; sent to me by Mr. Kershaw.

COPIDITA (Sub-section II.).

C. pulchra, sp. nov. Elongata, angusta; minus nitida; rufotestacea, capite antennis palpis pedibus (femorum basi excepta) abdomineque nigro-piecis, elytris læte cyaneis; capite sat brevi, crebrius subtilius punctulato; palporum maxillarium articulo ultimo subsecuriformi quam penultimus parum longiori; mandibulis ad apicem bifidis; antennis sat gracilibus; oculis magnis, fortiter granulatis; prothorace crebrius subfortiter punctulato, sat cordiformi, leviter inæquali (postice in medio, et antice utrinque, leviter impresso), quam latiori sat longiori; elytris confertim subtilius aspere punctulatis, lineis subelevatis 3 perspicue instructis. Long., $3\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l. (vix).

A very pretty species, with the general appearance of a *Dohrnia*, but having eyes granulated like those of a typical *Copidita*. The short apical joint of its maxillary palpi seems to me inconsistent with a place in the latter genus. However, fo present convenience I follow Mr. Horn in treating that as a non-generic character.

Victoria.

COPIDITA (Sub-section III.).

C. dentipes, sp. nov. Elongata, sat angusta; minus nitida; rufo-testacea, capite antennis palpis tibiis tarsis (horum articulis apicalibus 2 exceptis) metasterno abdomineque piceis vel nigro-piceis, elytris obscure cyaneis; capite sat brevi, subtilius minus crebre punctulato; palporum maxillarium articulo ultimo elongato-cultriformi; mandibulis ad apicem bifidis; antennis sat gracilibus; oculis magnis, grosse granulatis; prothorace crebrius subtilius punctulato, cordiformi, vix inæquali, quam latiori vix longiori; elytris confertim vix aspere subtilius punctulatis, lineis elevatis vix perspicue instructis; unguiculis subtus apicem versus dentatis (sub-bifidis). Long., $3\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

Very like the preceding *(C. pulchra)* in colour and general appearance, but, *inter alia*, easily distinguishable by its strongly dentate claws, which Mr. Horn would regard as removing it from *Copidita*. Its very strongly granulated eyes are inconsistent with *Ischnomera* (*Asclera*). No doubt it will eventually form a new genus.

Australia (exact locality uncertain).

DOHRNIA.

This genus was founded upon a species having extraordinary antennal sexual characters. The eminent specialist on the *Heteromera*, Mr. Champion (Tr. E.S., Lond., 1895, p. 246) states that those sexual characters are not generic, and describes a species from Tasmania in which they are wanting. I find that I have an undescribed species in my collection which may be referred to *Dohrnia*.

D. (*Ananca ?*) *Boisduvali*, Blackb. This species, referred by me to *Ananca* doubtfully (I regarded its simple antennæ as removing it from *Dohrnia*) is closely allied to *D. simplex*, Champ., which I have collected in various localities in Tasmania. It differs from the latter *inter alia* by the colouring of its head and legs, and by its much smaller prothorax, the sides of which are much more strongly incurved behind the anterior tuberosity, making the segment very much narrower in the hinder part and the extremities of the base much more prominent.

D. eremita, sp. nov. (Fem.). Elongata; supra plumbeo-nigra, prothorace rufo-testaceo; subtus nigroviridis, prothorace coxis (anticis aliqua ex parte exceptis) femoribusque (parte apicali excepta) testaceis; pube brevi subtus sparsim supra sat crebre vestita; antennis sat elongatis, articulis singulis pube (basin versus cinerea, apicem versus nigra) vestitis, 3us quam 2us vix tertia parte longiori, ultimo vix perspicue constricto; capite crebre subtilius punctulato, ante oculos modice elongato (quam *D. simplicis*, Champ., paullo magis lato minus elongato); oculis ut *D. simplicis;* prothorace cordato, antice transversim leviter impresso, crebre fortius subaspere punctulato; elytris ut *D. simplicis*, Champ. (crebre subtiliter punctulatis, lineis subelevatis 4 instructis). Long., 4 l.; lat., $1\frac{1}{5}$ l.

Resembles *D. simplex*, Champ., but differs from it by, *inter alia*, the different colouring of its legs and under surface, the considerably greater length of its antennæ, the evidently less prolongation of its head in front of the antennæ, and the much closer and stronger puncturation of its prothorax.

Victoria; Black Spur.

NACERDES.

N. melanura, Linn. This now cosmopolitan species occurs in widely separated localities in Australia. The examples before me are from S. Australia, N.S. Wales, and Victoria.

OXACIS (?)

As I have not seen an example of any American species of *Oxacis*, there is a doubt as to whether, if compared with an American specimen, the Australian insects that I attribute to the genus might not require the provision of a new generic name. Nevertheless, there is no character mentioned in Mr. Horn's diagnosis of the genus (unless it be "form slender," which scarcely fits the species before me) inconsistent with its applying to at least the first two of the species enumerated below. The other species do not appear to be separable from those two if structural differences so great as Mr. Horn includes within the limits of *Copidita* may be regarded as non-generic; although I have little doubt that the aggregates, which I now call sub-sections of *Oxacis*, will sooner or later be treated as good genera.

O. (*Œdemera*) *australis*, Boisd. (?). Modice elongata, minus angustata; breviter pubescens; cyaneo-plumbea, capite in medio palpis maxillaribus (apice summo excepto) mandibulis (nonnullorum exemplorum apice excepto) antennarum basi prothorace (macula magna utrinque posita excepta) coxis femoribus tibiisque rufo-testaceis; capite sat brevi, crebre

minus subtiliter punctulato ; palporum maxillarium articulo ultimo securiformi, quam præcedens multo longiori ; mandibulis ad apicem simplicibus minus acutis; antennis modice robustis longioribus (maris multo, feminæ parum) quam corporis dimidium, articulo 2° brevi, ultimo vix perspicue appendiculato ; oculis modicis, sat transversis, modice (*i.e.*, vix fortiter) granulatis ; prothorace subcordiformi, crebre subfortiter punctulato, ante medium transversim depresso, quam latiori paullo longiori ; elytris confertim subtiliter subaspere punctulatis, lineis subelevatis 3 vix perspicue instructis ; antennis ab oculis intervallo parvo separatis ; unguiculis inermibus. Long., 3—5 l. ; lat., 1—1½ l.

Boisduval's description merely mentions the colours and the puncturation of the prothorax, but as they apply very satisfactorily to the insect before me, I have thought it best to redescribe it with Boisduval's name,—which appears in Master's Cat. under *Ancana*. It agrees in all respects with Horn's diagnosis of *Oxacis* except in its form being (for an *Œdemerid*) somewhat robust rather than slender. Champion calls the eyes of *Oxacis* "coarsely" granulate (Horn does not characterise the eyes), which they are not in the present species, though they can scarcely be called "finely" granulate ; their granulation is finer than in *Copidita*, and less fine than in *Dohrnia* (e.g., *Simplex*, Champ.).

S. Australia ; not rare on flowers.

O. (*Ananca*) *Zietzi*, Blackb. This species agrees like the preceding with the characters attributed by Mr. Horn to *Oxacis* (in one of them even better, the antennæ being more slender) and agrees better with Mr. Champion's additional character, its eyes being somewhat more strongly granulated ; nevertheless, it cannot, in my opinion, be rightly regarded as congeneric with the preceding, differing from it in respect of characters that are not mentioned by Horn or Champion, of which the principal seems to be as follows :—The apical joint of the maxillary palpi, while twice as long as the preceding joint, is much less strongly securiform than the same joint in *australis*, Blackb. (? Boisd.) ; the tarsi are much more slender, and, owing to the penultimate joint being much smaller, the claw joint projects very much further beyond the penultimate ; owing to the long immersion in spirits of the insects of the Callabonna expedition, the exact structure of the under surface of the tarsal joints in this species is not easy to determine, but as far as I can see the antepenultimate, as well as the penultimate, joint is spongy-pubescent, and if I were sure of that character it would, no doubt, justify the creation of a new genus for *O.* (*?*) *Zietzi*. Its mandibles are (like those of *australis*) simple at the apex ; though *narrowed* to the

apex, the actual termination is obtuse, not (as it should be in *Oxacis*) acute, but if the expression be taken in a general sense as equal to "pointed," it would apply well enough.

OXACIS (?) (Sub-section I.).

O. (?) *inquisitor*, sp. nov. Modice elongata, minus angusta; breviter pubescens; pallide testacea, mandibularum apice prothoracis linea longitudinali mediana elytris (margine angusta excepta) et abdomine plus minusve infuscatis; capite elongato, minus crebre minus subtiliter punctulato; palporum maxillarium articulo ultimo leviter securiformi, quam præcedens paullo longiori; mandibulis ad apicem simplicibus, vix acutis; antennis gracilibus, articulo apicali vix perspicue appendiculato; oculis magnis, leviter transversis sat fortiter granulatis; prothorace subcordiformi ut caput punctulato, vix inæquali, quam latiori vix longiori latitudine majori ad apicem sita; elytris confertim subtiliter nec aspere punctulatis, lineis subelevatis vix perspicue instructis. Long., $4\frac{1}{2}$ l.; lat., $1\frac{1}{3}$ l.

This species is unmistakable, by the characters cited in the preceding table. In colouring it evidently resembles *Copidita bipartita*, Champ., from which its simple mandibles, no doubt, readily separate it. In one specimen there is on the elytra a short streak of paler colour from the base on the middle of the disc in addition to the pale margin; in another example (an immature one, I think) the prothorax has several feeble impressions.

N.W. Australia.

O. (?) *ornatipennis*, sp. nov. Elongata, angustata; pubescens; piceo-nigra, labro mandibulis basin versus antennis palpis prothoracis vittis 2 elytrorum marginibus vittisque discoidalibus nonnullis et pedibus plus minusve testaceis; capite minus elongato, crebrius minus subtiliter punctulato; palporum maxillarium articulo ultimo elongato-securiformi, quam præcedens duplo longiori; mandibulis ad apicem simplicibus subacutis; antennis gracilibus, articulo ultimo vix manifeste appendiculato; oculis magnis, transversis, fortiter granulatis; prothorace subcordiformi, ut caput punctulato, inæquali (utrinque longitudinaliter impresso), quam latiori parum longiori, latitudine majori paullo ante medium sita; elytris crebre subtilius punctulatis, lineis subelevatis vix perspicue instructis. Long., 4 l.; lat., 1 l.

The testaceous lines on the elytra are one sutural, one marginal, and one intermediate between the former two, all narrow, sharply defined, and apparently constant; some examples have

faint indications of other lines in the intervals between the three well-defined lines. This species is quite unlike any other of the preceding species on account of its long narrow form as well as its style of colouring; its general appearance is distinctly suggestive of the *Longicorn* genus *Syllitus*. Its structural characters do not seem to differ much from those of the preceding species (*inquisitor*) except in its head being less elongate, and the apical joint of its maxillary palpi being longer in proportion to the second joint. Its prothorax is distinctly more elongate, and has its greatest width not very much in front of the middle. Compared with *australis* and *Zietzi* it has the head narrower (and consequently longer in proportion to the width) in front, and its eyes considerably more strongly granulate, with the apical joint of the maxillary palpi *more* strongly securiform than in *Zietzi*, and less so than in *australis*.

N.W. Australia.

OXACIS (Sub-section II.).

O. (*?*) *caviceps*, *sp. nov.* Modice elongata, minus angustata; pubescens; testacea, capite (postice) mandibulis ad apicem prothorace (hoc inæqualiter trivittatim) elytris (margine et notulis nonnullis longitudinalibus discoidalibus antemedianis exceptis) antennis tarsisque plus minusve infuscatis; capite elongato longitudinaliter concavo, subtilius minus crebre punctulato; palporum maxillarium articulo ultimo leviter securiformi, quam præcedens paullo longiori; mandibulis ad apicem simplicibus subacutis; antennis gracilibus, articulo apicali vix perspicue appendiculato; oculis permagnis, fortiter longitudinalibus (superne visis), fortiter granulatis; prothorace subcordiformi, ut caput punctulato, vix inæquali, quam latiori parum longiori, latitudine majori sat longe pone apicem sita; elytris confertim subtiliter subaspere punctulatis, lineis subelevatis vix perspicue instructis. Long., $4\frac{1}{2}$—$5\frac{1}{2}$ l.; lat., $1\frac{1}{3}$—$1\frac{2}{3}$ l.

Evidently near *inquisitor* and much like it in colour and markings, the infuscate parts however being much darker in the present species, which moreover is decidedly more nitid. The difference in the shape of the eyes however is so great as to suggest more than specific separation, and I do not think that difference is sexual. The shape of the ventral segments is uniform in all the specimens before me of both species (the apical segment being widely rounded at its apex), but there are specimens of either species with protruding *genitalia* obviously identical in sex. Other structural differences are to be found in the head of *caviceps* being longitudinally concave and

its prothorax at the widest considerably behind the middle, while the head of *inquisitor* is not longitudinally concave, and its prothorax is at the widest across the apex.

N.W. Australia.

O. (*?*) *linearis*, sp. nov. Elongata, angusta; pubescens; piceo-fusca, labro mandibulis basin versus clypeo (antice) antennarum articulo basali (subtus) prothoracis vittis 2 elytrorum marginibus vittisque discoidalibus nonnullis et pedibus (his fusco-adumbratis) testaceis; capite valde elongato, sparsius fortius inæqualiter punctulato; palpis maxillaribus elongatis, articulo ultimo elongato-cultriformi quam præcedens sat longiori; mandibulis ad apicem simplicibus minus acutis; antennis gracilibus (exempli typici articulo ultimo carenti); oculis permagnis fortiter longitudinalibus (superne visis), fortiter granulatis; prothorace vix subcordiformi, fere ut caput sed paullo magis crebre punctulato, indeterminate inæquali (in medio longitudinaliter plus minusve subcarinato et latera versus subimpresso), quam latiori dimidio longiori, latitudine majori paullo ante medium sita; elytris crebre subtilius aspere punctulatis, lineis subelevatis haud instructis. Long., 3—4½ l.; lat., $\frac{4}{5}$—1$\frac{1}{10}$ l.

This is a very interesting little insect, and combines resemblance to one and another of the preceding five species in a distinctly perplexing fashion. In shape, colour, and markings it is extremely like *ornatipennis*, but has, *inter alia*, the head very much more elongate, the maxillary palpi very much more elongate, the eyes quite differently shaped, the prothorax very much more elongate and differently shaped, and the elytral markings different in detail. In *ornatipennis* the well-defined apparently constant lines are three in number (including the suture and lateral margins) while in *linearis* there is an additional one similar to the other three, and placed a short distance from the lateral margin, and another (which, however, only reaches to about the middle of the elytra) placed at a short distance from the suture. The prothorax, to a casual glance, might appear as if it ought to be called subcylindric, but on careful inspection it is found to be of essentially similar form to those of its allies, the difference being only of degree, owing to the less development of the rotundity of outline in the front part of the sides. Its eyes are altogether like those of *O. caviceps*, from which, *inter alia*, it differs by the even longer and more rostriform front part of its head, its very differently shaped and proportioned prothorax, its very different markings, and much narrower build.

W. Australia (Coolgardie, &c.).

A specimen sent to me by Mr. Lea as his *Lemodes corticalis* is certainly congeneric (I think it is conspecific, though somewhat differently coloured) with my *T. victoriensis*. On careful consideration I think that, in spite of much unlikeness in facies, it is really allied to *Lemodes*, though not generically identical. Apart from general facies, I find *inter alia* that the apical joint of the maxillary palpi in *Lemodes* is an equilateral triangle reversed (its apex in contact with the penultimate joint, its base forming the truncate apex of the palpus), while in *Trichananca* the apical joint is an isosceles triangle connected with the penultimate joint by a short stem protruding from the extremity of the base,—much as it is in *Copidita*; in *Trichananca* the eyes are very much larger and more coarsely granulate than in *Lemodes*; in *Trichananca* the front tarsi have their basal two joints of equal length viewed from above, on the undersurface the basal joint is seen to be considerably the longer (the basal joint being strongly produced on one side, so as to resemble a bilobed joint with one of its lobes broken off), and the claw joint is very short (the part projecting beyond the fourth joint not being longer than the fourth joint itself), while in *Lemodes* the basal joint is simple, and twice as long as the second, the second third and fourth joints are equal *inter se* and the claw joint is as long as the preceding three together; in *Trichananca* the head is very short in front so that the interval between the base of the mandibles and of the antennæ is almost nil, while *Lemodes* has a distinct muzzle so that there is quite a long interval between the base of the antennæ and of the mandibles; in *Lemodes* the base of the head is almost straight and scarcely narrower than the head across the eyes, while in *Trichananca* the width across the eyes is by far the greatest width of the head. Unquestionably, however, the structure of the sterna and coxæ is sufficiently similar in the two genera to suggest the probability of their being allies, which is further indicated by the resemblance of the penultimate two joints of the maxillary palpi in one and the other. It is possible, therefore, that I was in error in referring this insect to the *Œdemeridæ*, and that if *Lemodes* is rightly placed in the *Pyrochroidæ* (concerning which M. Lacordaire expresses his doubt) the present genus also should, perhaps, stand in that family. It should, however, be added that *T. victoriensis* bears much more superficial resemblance to the Tasmanian and New Zealand *Techmessa* than to *Lemodes*, except, perhaps, in its distinctly cordiform prothorax and stouter legs; though its coarsely granulated eyes and other characters forbid its being referred to that genus. I cannot agree with Mr. Lea's remark that the head has a distinct neck. The relation between the head and prothorax is quite as in *Techmessa*.

TECHMESSA.

I have in my collection a Tasmanian specimen which seems to be decidedly congeneric with Mr. Champion's *T. ruficollis*. Indeed, as I can find no discrepancy even as a *species* between it and Mr. Champion's description, except in respect of colour, I am obliged to regard it provisionally as a variety of that insect. It is entirely black, except the mouth organs and labrum the summit of the front coxæ and the trochanters which are pitchy-testaceous. It even presents the same prothoracis peculiarity as Mr. Champion's specimen (and which he mentions as abnormal) in that the prothorax is rounded on one side and subangularly dilated on the other. I consider it unquestionably allied rather closely as a genus to my *Trichananca* from which, however, it is readily separated by good generic characters, especially the fineness of the granulation of its eyes, the considerably less dilatation of the apical three joints of it maxillary palpi, and the greater slenderness of its front tarsi—and, indeed, of its legs altogether.

PSEUDOLYCUS.

The species of this genus are extremely variable in respect of colour and markings and unfortunately colour distinctions are almost the only ones that have been referred to in the descriptions. The number of names that have been applied to real or supposed members of *Pseudolycus* are, so far as I know, seven, and one of them (*P. apicalis*), as I have already stated, does not represent a true *Pseudolycus*. *P. cinctus*, Mr. Champion has shown (*loc. cit.*) to be a variety of *hæmorrhoidalis*, Fab., and it seems to be hardly doubtful that *atratus*, Guèr., is another variety of the same. *P.* (*Œdemera*) *luctuosa*, Boisd., is described in seven words, which exactly agree with the brief description of *P. atratus*, Guèr.; nevertheless, inasmuch as there is another species of which they might very well be a Boisduvallian description, and there is good reason to think that *luctuosa* was not founded on a Tasmanian specimen, it seems desirable to claim Boisduval's name for this latter species which, although very close to *P. hæmorrhoidalis*, Fab. (= *cinctus*, Guèr. = *atratus*, Guèr.) is, I believe, really distinct from it. *P. marginata*, Guèr., is the one species of the genus that may be identified with some confidence by the description of its author, and this identification is confirmed by the specimens which agree with the description having been taken in the locality cited by Guèrin. There remains *P. hæmoptera*, Guèr., and this its author only *conjectures* to be Australian. I have before me a *Pseudolycus* (in Victoria the most plentiful species of the genus) which agrees fairly well with Guèrin's description (differing most in being smaller than the size Guèrin states) and which, I think, may fairly be treated as

hæmoptera—at any rate until an examination of the type shall prove the contrary.

Thus I regard *Pseudolycus* as at present consisting of four species, viz., *hæmorrhoidalis*, Fab., *luctuosa*, Boisd., *marginata*, Guèr., and *hæmoptera*, Guèr., to which I have to add two new ones. The following table indicates characters by which the six may be indentified :—

A. Prothorax having two ridges, which diverge obliquely hindward from the middle of the median line enclosing a triangular depression. (Antennæ unicolorous).
  B. Prothorax distinctly cordiform.
    C. Prothorax notably wider than long. (Hind tarsi unicolorous) ... ... *hæmorrhoidalis*, Fab.
    CC. Prothorax not (or scarcely) wider than long. (Base of hind tarsi testaceous) ... *luctuosus*, Boisd.
  BB. Prothorax scarcely cordiform. (Base of hind tarsi testaceous) ... ... *marginatus*, Guèr.
AA. Middle longitudinal line of prothorax continuously convex or carinate. (Antennæ not unicolorous)
  B. Surface of prothorax very uneven through the presence of large impressions and foveæ.
    C. Prothorax notably longer than wide, and feebly cordiform ... ... *elegantulus*, Blackb.
    CC. Prothorax only slightly longer than wide, strongly cordiform ... ... *hæmopterus*, Guèr.
  BB. Surface of prothorax even or nearly so ... *puberulus*, Blackb.

P. hæmorrhoidalis, Fab. I have not seen this species except from Tasmania. So far as my observation goes the colour is uniformly black, except the elytra, which vary from entirely black (if *atratus* is a var. of it) through forms in which only the apex of the elytra is red (type), and others in which the sides, or the sides and suture (*cinctus*), as well as the apex are red, to a form in which the elytra are entirely red (figured by Mr. Champion, *loc. cit.*, and in my collection). From its nearest allies it is distinguishable also by its prothorax of evidently (though not at all strongly) cordate form, and quite strongly transverse.

P. luctuosus, Boisd. The species to which I apply this name occurs in Victoria, and closely resembles *hæmorrhoidalis*, Fab. In colour its elytra vary exactly as those of *hæmorrhoidalis* do, and in addition the specimens with red elytra have some red blotches on the prothorax. The base of the basal joint of the hind tarsi seems to be invariably whitish testaceous. The prothorax is sculptured on the upper surface like that of *hæmorrhoidalis*, but is scarcely wider than long, and is very evidently more cordiform. The antennæ are like those of *hæmorrhoidalis* in their dilated joints being very strongly dilated in both sexes.

P. marginatus, Guèr. A wider, more depressed, and more fragile-looking species than either of the preceding. I have seen only two examples of it, and, therefore, cannot say much about its variability. In both of these there is a large, somewhat oval spot of pale testaceous colour on either side of the prothorax, one side of either spot (as viewed from above) placed so close to the side of the prothorax as almost (but not quite) to form the lateral margin. The shoulders and apex of the elytra in both are testaceous. In one of them the apical colour runs up the suture and lateral margin only for a short distance; in the other it extends forward to the shoulders on the lateral margin, and almost to the base on the suture. The hind tarsi are coloured as in *luctuosus*, but the pale colouring is only at the *extreme* base. The prothorax can be called cordiform even less decidedly than that of *hæmorrhoidalis*, the greater part of the sides being only very feebly rounded, and their hinder sinuation being only close to the base. The antennæ are like those of *luctuosus*.

P. elegantulus, sp. nov. Mas. Elongatus, gracilis; colore probabiliter variabilis, exempto typico nigro rufo-notato [sc. prothorace (vitta mediana et macula parva utrinque posita exceptis) elytris (vittis angustis 3 exceptis) et antennarum articulis 8° fere toto 9° que ad basin, rufis]; capite subtilius minus crebre punctulato; antennarum articulis 3°—7° leviter dilatatis (3° quam 1us parum latiori, ceteris gradatim angustioribus, 7° quam 8us parum latiori); prothorace nitido, leviter cordiformi, quam latiori sat longiori, in medio longitudinaliter leviter obtuse elevato, utrinque late minus profunde impresso; elytris confertim subtiliter subaspere punctulatis pubescentibus, costis 4 latis obtusis discoidalibus instructis. Long., $3\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.

Fem. latet.

Differs from all the other *Pseudolyci* known to me by the sculpture of its prothorax; also differs from *hæmorrhoidalis* and *luctuosus*, and probably also from *marginatus* (of which I have not seen a male) in the dilatation of the intermediate joints of the antennæ being very feeble in the male. Its nearest ally seems to be the species I have called *hæmoptera*, from which it differs, *inter alia*, by its much less cordiform more nitid less closely punctulate and very differently coloured prothorax (which, moreover, has not a well-defined median carina), by the much greater width of the elevated lines on its elytra, and by its shorter head.

Victoria.

P. hæmopterus, Guèr. The insect that I believe to be the original of this species is somewhat common in the mountainous

parts of Victoria, and is (as its author says *hæmopterus* is) somewhat more convex than most *Pseudolyci* are. Its colour is very variable as regards the prothorax and elytra, the former being usually black but in some examples with red markings, and the latter red with black markings which vary from a single subsutural line through intermediate forms to a form in which only the apex and the hind part of the lateral margin are red. The rest of the insect is black except the eighth and ninth antennal joints, which are partly testaceous. In the male the antennal structure is like that of the male of the preceding species (*elegantulus*). In the female joints 3—7 (especially 3—5) are more strongly dilated, but evidently less strongly (6 and 7 very much less strongly) than in *hæmorrhoidalis* and its allies. The prothorax is subopaque, strongly cordiform, distinctly longer than wide, closely finely and subasperately punctulate, finely and quite sharply carinate the length of the middle line (the carina, however, not quite reaching the base), and has a large strong fovea on either side of the middle line a little behind the apical margin.

P. puberulus, sp. nov. Fem. Elongatus, sat angustus ; sat dense pubescens ; colore probabiliter variabilis, exemplo typico nigro rufo-notato [sc. prothoracis macula magna hirsuta basali utrinque posita, elytrorum vitta brevi angusta subsuturali, et antennarum articulis 8° 9° que (hujus apice excepto), rufis vel testaceis] ; capite minus brevi, sat nitido, crebrius subtilius (nullo modo aspere) punctulato ; antennarum articulis 3° — 5° modice (6° 7° que leviter) dilatatis ; prothorace quam latiori parum longiori, cordiformi, fere æquali, longitudinaliter in medio minus perspicue elevato ; elytris confertim subtiliter subaspere punctulatis, lineis 4 discoidalibus leviter elevatis instructis. Long., $4\frac{1}{2}$ l. ; lat., $1\frac{3}{10}$ l.

Mas. latet.

A very distinct species ; more closely pubescent than its allies ; and at once distinguishable from the other *Pseudolyci* known to me by the large patch of fulvous pubescence at the base of the prothorax on either side of the median line, as well as by the almost even surface of that segment. The structure of the antennæ of the female is much like that of the female of *hæmopterus*.

N.S. Wales ; Blue Mountains.

CURCULIONIDÆ.

ECRIZOTHIS (gen nov. *Leptopsidarum*).

Rostrum robustum breve, ad apicem dilatatum et ut *Leptops* lamina glabra subtriangulari instructum, supra 3-carinatum ;

scrobes submedianæ, antice latæ, postice vix distinctæ ; antennæ robustæ, scapo prothoracem vix attingenti, funiculo 7-articulato (articulis 3 basalibus quam latioribus paullo longioribus, 4—6 brevioribus, 7° longiori), clava distincta ; oculi modici obliqui late ovales ; prothorax subcylindricus, lobis ocularibus fere nullis ; scutellum indistinctum ; pedes modici, tibiarum corbulæ apertæ ; unguiculi liberi ; metasternum breve ; processus intercoxalis minus latus ; corpus squamosum et setosum.

I found this genus for a remarkable little species that I have had for some time past unnamed in my collection, and which has recently been sent to me by Mr. French with the information that it is destructive to vegetation in Victoria. I feel some hesitation in assigning it to the *Leptopsides*, but it seems to be more at home there than anywhere else ; moreover, Mr. Lea (who has lately been much occupied with the Australian *Curculionidæ*) tells me that he regards it as an undescribed *Leptopsid* genus. The extreme feebleness of the ocular lobes and the wide obliquely-placed eyes are unusual in the Tribe. The following characters in combination distinguish this from the other characterised Australian *Leptopsid* genera :—Corbels of hind tibiæ open, claws normal and free, scape of the antennæ reaching (when set back) to the prothorax. Probably its nearest ally is *Scotasmus* (which I have not seen), which differs from it, *inter alia*, by the scape of its antennæ reaching only to the eyes.

E. inæqualis, sp. nov. Piceus, squamis albidis fuscisque confertim et setis brevibus suberectis (his ut squamæ coloratis) minus crebre vestitus ; prothorace quam longiori vix latiori (latitudine majori paullo ante medium posita), crebre subtilius ruguloso et indeterminate inæquali ; elytris striatis, striis crenulato punctulatis, interstitiis confertim subtilius punctulatis, interstitio 3° tuberculis circiter 4 obtusis armato (ex his posterioribus 2 sat magnis), interstitio 5° tuberculis nonnullis subobsoletis armato. Long. (rostro incl.), $2\frac{2}{3}$ l.; lat., 1 l.

In fresh specimens the whitish and pale fuscous scales so thickly cover the whole surface that no sculpture is noticeable, except the hinder two tubercles on the third interstice of each elytron.

Victoria.

CUBICORHYNCHUS.

C. tortipes, Blackb. Mr. Lea tells me that he has examined the type of *C. angularis*, Macl., and finds that *tortipes* is identical with it. Mr. Pascoe (Journ. Linn. Soc., 1873) states, "on the authority of Mr. Duboulay," that *angularis* is the male of

Bohemanni, Schh. There is nothing in the description of *C. angularis* on which any opinion could be formed as to the correctness of the above synonymy.

HYBORRHYNCHUS.

H. aurigena, sp. nov. Piceus, squamis albidis fuscisque intermixtis confertim vestitus; rostro lato brevi, utrinque obtuse carinato-marginato, margine supra oculum abrupte desinente tuberculum conicum simulanti; capite postice convexo, a clypeo sulco profundo distincto, pone sulcum longitudinaliter rugato et tuberculis parvis instructis, in vertice anguste impresso et bituberculato; prothorace transverso, postice angustato, canaliculato, supra sat plano confuse tuberculato, ad latera utrinque ante medium acute bituberculato; elytris seriatim tuberculis parvis instructis (tuberculis inter se sat æqualibus, crebre dispositis, singulis setas singulas ferentibus), biseriatim in interstitio 3° leviter 4-gibbosis, ad apicem inermibus. Long. (rostro. incl.), 5 l.; lat., $1\frac{4}{5}$ l.

The absence of a mucro at the apex of the elytra distinguishes this species from all its previously described congeners except *rugosus*, Macl., *crassiusculus*, Macl., and *Mastersi*, Macl. From *rugosus* and *Mastersi* it differs, *inter alia*, by its elytra having no tubercles notably larger than the rest about the hind declivity, and from *crassiusculus* by the very different sculpture of its head and prothorax.

W. Australia; taken by Mr. Froggatt at Kalgoorlie.

CENTYRES.

C. delens, sp. nov. Piceus, setulis brevibus albidis minus crebre, et squamis ochraceis fuscisque dense vestitus, his in prothorace medio vittatim et in elytris disperse maculatim condensatis; antennis fuscis, scapo modice elongato, articulis basalibus 2 sat elongatis inter se sat æqualibus; rostro subobsolete tricarinato; prothorace leviter transverso, antice leviter angustato, punctulato, obsolete vermiculato-ruguloso, lateribus minus fortiter rotundatis; elytris ampliatis, sat convexis, punctulato-striatis, interstitiis leviter convexis; tibiis anticis intus minus perspicue denticulatis,—posticis ad apicem cavernosis; abdominis segmento 2° quam 3us parum longiori. Long. (rostr. incl.), 4 l.; lat., $1\frac{3}{5}$ l.

Differs from the previously described species by the median fuscous vitta of its prothorax and the small fuscous spots on its elytra, and by the less distinct denticulations of its front tibiæ. Compared with *C. turgidus*, Pasc., it is much smaller, &c.; with *ovis*, Pasc., it is of considerably more convex build; while i

differs from *sinuatus*, Blackb., *inter alia* by its prothorax with less strongly rounded sides and narrower in proportion to the elytra.

N.S.W. ; sent by Mr. Froggatt, and stated to be destructive to vines.

LONGICORNES.

YORKEICA (gen. nov. *Phoracanthidarum*).

Palpi subæquales sat breves robusti, ad apicem truncati ; caput breve ; antennæ quam corpus parum longiores (articulis 1° subpiriformi, 2° brevi, 3° quam 1us paullo longiori, 4° quam 1us vix longiori, 5° quam 3us sublongiori, ceteris longioribus, 11° appendiculato), articulis 3—7 ad apicem utrinque spinosis (spina externa quam interna majori) ; oculi sat grosse granulati ; prothorax inermis ; elytra ad apicem bispinosa ; pedes antici quam posteriores multo breviores ; femora sat lineares ; tarsi sat breves, articulo basali quam latiori vix duplo longiori, quam sequentes 2 conjuncti sat breviori, unguiculi divergentes ; coxæ intermediæ clausæ.

The position of this genus is very difficult to determine. According to Lacordaire's classification it is a *Phoracanthid* on account of the strongly granulated eyes, spined antennæ, and closed intermediate coxal cavities ; therefore I place it among the *Phoracanthid* genera.* But its prothorax unarmed at the sides and scarcely tuberculate above, and its short tarsi (with the basal joint distinctly shorter than the following two together, and the claw joint very little shorter than the preceding three together) separate it very widely from all other *Phoracanthides* known to me, and are almost *Lamiid* in appearance. The front legs very short in comparison with the four hinder legs perhaps suggest an affinity to the genus *Xypeta*, Pasc., but, otherwise, it does not seem to resemble *X. grallaria*, Pasc. I am not sure of the sex of the type, but think it probably a female.

Y. marmorea, sp. nov. Picea, pube cinerea et fulva marmorata ; prothorace leviter transverso, in disco ante medium tuberculis parvis nonnullis instructo, lateribus leviter arcuatis ; elytris antice sat grosse punctulatis et tuberculis plurimis nitidis parvis armatis, postice sparsim minus profunde punctulatis nec tuberculatis. Long., 16 l. ; lat., 5 l.

The markings resulting from the presence of ashy and fulvous pubescence on the piceous derm are extremely intricate. On the head an ashy line runs down the middle, a fulvous line runs

* Since this was written Mr. Gahan,—to whom as an eminent specialist on the *Longicornes* I submitted my specimen for inspection,—has favored me with his opinion that *Yorkeica* is correctly placed in *Phoracanthides* as a new genus. He thinks it near *Demelius*.

across the base, and there is fulvous pubescence on the labrum and the inner margin of the eyes. The prothorax is confusedly marbled with ashy and fulvous pubescence. The elytra may be described as marbled with ashy pubescence, which is interrupted here and there by bare spaces of piceous derm and also by nitid tubercles, and is traversed by four longitudinal lines of fulvous pubescence extending from the base to the apex,—these lines being themselves much interrupted by bare spots of derm and nitid tubercles. The antennæ are closely clothed with ashy pubescence except at the extreme apex of each joint. The legs are marbled with ashy pubescence, and there are some spots of fulvous pubescence on the femora. The under surface is covered with ashy pubescence in which, however, are numerous small bare spots of derm, and also many large blotches (generally transverse) of fulvous pubescence.

N. Queensland (Cape York); sent to me by Mr. French.

BETHELIUM.

B. (*?*) *spinicorne*, sp. nov. Rufo-ferrugineum (nonnullorum exemplorum elytris abdomineque infuscatis), elytris fasciis binis pallide flavis (altera angusta angulata ante medium, altera sat lata obliqua pone medium, positis) suturam haud attingentibus ornatis; parce setosum; prothorace subcylindrico, antice posticeque leviter angustato, crebre subobsolete punctulato, lateribus leviter arcuatis; elytris a basi usque ad fasciam posticam sat crebre sat fortiter (postice obsoletius) punctulatis; antennis quam corpus paullo longioribus, articulis 3° (hoc ad apicem spina elongata armato) quam 1us vel 4us sat longiori, 5°—9° inter se sat æqualibus (his quam 3us sublongioribus). Long., 5 l.; lat., $1\frac{1}{5}$ l.

I have recently received this species from Mr. French. It is evidently the insect referred to by Mr. Gahan (Tr. Ent. Soc., Lond., 1893, p. 178) as allied to, but distinct from, *B. Blackburni*, Gahan. Mr. Gahan thinks it doubtful whether it is a true *Bethelium*, and I share his doubt, as the antennal spine is not present, and the elytral markings are of a different kind (not of the slightly raised, ivory-like, description they are in the present species) in the type of the genus (*B. signiferum*, Newm.). From Mr. Gahan's remarks on *B. Blackburni*, however, I should judge that that insect is intermediate between the present species and *B. signiferum*, having the elytral markings of the former but not the antennal spine; and if so there may be other intermediate forms yet to be discovered which may prove the antennal spine not to be a truly generic character.

Victoria.

B. tricolor, Blackb. Mr. Gahan (*loc. cit.*) thinks that this may be the same thing as *Ectosticta simillima*, White, remarking at the same time the close resemblance and alliance between *Bethelium* and *Ectosticta*, a resemblance which I also had referred to in a former paper. It is difficult to arrive at certainty without seeing the type of *E. simillima* as to whether Mr. Gahan's surmise is correct, but it is quite certain that *B. tricolor* has the eyes of a *Bethelium* and not of an *Ectosticta*—so that if the above synonymy is to be accepted *E. simillima* must be removed from *Ectosticta* to *Bethelium*.

SISYRIUM.

S. sparsum, Blackb. Mr. Gahan (*loc. cit.*) thinks it not unlikely that this is identical with *S. stigmosum*, Pasc. Unfortunately the matter could be decided only by a comparison of types. My species was described on a unique male, Mr. Pascoe's on a female. Compared with the figure of the latter, *S. sparsum* is very much smaller and of more slender build, with the anterior dark mark on the elytra (not a fine line as in *stigmosum*, but) a large quadrate blotch nearly as wide as long. It is quite *possible* that these differences appertain to the sexes of one species that is variable in its markings, but it is to be noted that when the type of *sparsum* is compared with Pascoe's description the following differences also appear :—The prothorax is of much darker colour than the description indicates, and I cannot trace five unpunctured spaces on that segment, the unpunctured spaces appearing as three longitudinal zones. In the type of *sparsum* there is a large deep fovea on the disc of the prothorax immediately in front of the base which looks, however, as if it might be accidental, and on account of my suspecting it to be so I did not emphasize it in describing the species, but merely called the prothorax "inæqualis."

S. ventrale, Blackb. Mr. Gahan (*loc. cit.*) seems to think that this may be identical with *stigmosum*, Pasc., if *sparsum*, Blackb., is not ; this, however, can hardly be the case, for he states that by measurement the length of the prothorax of *stigmosum* is all but half greater than the width, whereas, in *ventrale* the length is all but the same as the greatest width (it is about as 16 to 15).

S. vittatum, Blackb. (? var. of *stigmosum*). I do not see where the mistake that Mr. Gahan perceives in my remarks on this insect comes in, as I expressed no opinion as to the proportions of the prothorax in *stigmosum*, but merely indicated as my reason for not emphaising very much the difference between the proportions of the prothorax in it and the var. *vittatum* that Mr. Pascoe did not *say* that he had measured the prothorax of *stigmosum*, and that if he had not done so his statement of the proportions would not be realiable enough to confirm the distinctness of *vittatum*

from his insect. It is satisfactory, however, that Mr. Gahan is able to decide this point definitely, and states that *S. vittatum* is *not* a var. of *stigmosum*.

TESSAROMMA.

T. nanum, sp. nov. Subtus piceum, metasterno dilutiori ; supra piceum, capite prothoracis parte antica-mediana et elytris postice indeterminate rufescentibus, antennis palpis pedibusque (femorum parte clavata obscura excepta) rufo-testaceis ; setis fulvis erectis sparsis instructum, elytris pube argenteo-sericea maculatim ornatis ; capite confertim subtiliter aspere punctulato, linea longitudinali mediana vix perspicue impresso ; antennarum articulo 3° leviter arcuato ; prothorace quam latiori perspicue longiori, antice posticeque leviter constricto, ad latera media spinoso, dorso longitudinaliter bicristato, cristis a margine antico fere ad basin continuis ; elytris basin versus sparsim granulatis, ad apicem rotundato-truncatis. Long., 3½ l. ; lat., 1 l. (vix).

At once distinguishable from its previously described congeners by, *inter alia*, its much more slender legs and antennæ, its head not impressed with a well-defined median longitudinal furrow, its prothorax with (the ill-defined pair of median gibbosities of the other species represented by) two well-defined elevated longitudinal crests, which are quite traceable to the front margin, though much more feeble (and also more widely separated from each other) on the part in front of the anterior constriction than behind it (in fact the crests on that part ought perhaps to be described rather as isolated sub-obsolete crests not quite in line with the larger ones), and its elytra with spots of silvery pubesence similar to those of *P. undatum* in the front two-thirds of their length, but having the apical one-third densely and quite uniformly clothed with the pubescence. The very small size of this species, of course, also distinguishes it. The two divisions of the eyes are very widely separated from each other, and coarsely granulated. Viewed from the side the gibbosity of the prothorax is markedly greater than in either *undatum*, Newm., or *sericans*, Er.

Queensland ; sent by Mr. French.

PHYTOPHAGA.

COOLGARDICA (gen. nov. *Sagridarum*).

Caput abrupte declive, modice elongatum ; palporum maxillarium articulus ultimus ovalis ; oculi sat parvi, transversim ovales, fortiter prominentes, grosse granulati ; antennæ filiformes quam corpus circiter dimidio breviores, articulo ultimo appendiculato ; prothorax cordiformis, angulis anticis rotun-

datis, posticis subdentiformibus; elytra quam prothorax sat latiora, sat brevia, ad apicem inermia; prosternum inter coxas anticas angustum, quam coxæ minus elevatum; mesosternum ante coxas intermedias sat longe productum; metasternum inter coxas intermedias haud productum; abdominis segmentum basale quam sequentia 3 conjuncta vix brevius, antice sat angustatum; pedes sat breves, femoribus (præsertim posticis) crassis, posticis subtus prope apicem dente acuto armatis, tarsis brevibus (inter se æqualibus, articulis basalibus 3 inter se æqualibus latis quam latioribus haud longioribus, unguiculis simplicibus.

It will be seen from the preceding diagnosis that this genus in many respects resembles *Duboulayia*, but differs from it notably by its small excessively prominent eyes, and its front coxæ rising considerably above the level of the narrow intermediate space. Its eyes are not unlike those of *Polyoptilus*, though smaller, but it differs entirely from *Polyoptilus* in the structure of its tarsi. From *Megamerus* it differs, *inter alia*, by the small oval apical joint of its maxillary palpi, from *Prionesthis* and *Cheiloxena* by its strongly toothed hind femora, from *Carpophagus*, *Diaphanops*. *Mecynodera*, and *Amettala* by the extremely coarse granulation of its eyes, and from *Pseudotoxotus* by its short tarsi. In Chapuis' arrangement of the *Sayrides* its place is in the "Groupe" *Megamerites*. There are four examples before me (three of them belonging to the S.A. Museum) among which I cannot detect any indication of sexual differences. Although I have not a specimen that I can damage sufficinetly to make a proper examination of its *ligula* I can see that that organ is of the *Sagrid* as distinguished from the *Criocerid* character.

C. tenebrioides, sp. nov. Nigra vel ferruginea, omnium exemplorum palpis antennarum basi apiceque et abdomine rufescentibus; sat nitida; capite prothoraceque confertim subtilius subaspere punctulatis; antennis quam corporis dimidium vix longioribus, sat gracilibus articulis 3° 4° que inter se sat æqualibus; oculis sat parvis, transversis, grosse granulatis; prothorace subcordato (nonnullorum exemplorum indeterminate inæquali); elytris sat fortiter vix crebre subseriatim punctulatis, lineis subelevatis 4 instructis; corpore supra fere glabro, subtus pubescenti. Long., 4 l.; lat., $1\frac{3}{5}$ l.

A short robust insect somewhat resembling in build certain small species of the *Tenebrionid* genus *Menephilus*, varying in colour from ferruginous to black. In one of the darkest specimens the shoulders are ferruginous.

W.A. (Coolgardie).

NEODIAPHANOPS (gen. nov. *Sagridarum*).

Caput declive, minus elongatum; palporum maxillarium articulus ultimus ovalis; oculi sat parvi, transversim ovales, sat prominuli, subtilius granulati; antennæ robustæ, quam corpus paullo breviores, articulis intermediis compressis (maris quam feminæ magis fortiter, ultimo feminæ appendiculato maris deformi); prothorax subcylindricus, latitudine majori ad basin sita (fere ut *Diaphanopis*), angulis anticis vix distinctis; elytra quam prothorax multo latiora, fere a basi dehiscentibus, ad apicem rotundata; prosternum inter coxas angustum, quam coxæ vix minus elevatum; metasternum inter coxas intermedias haud productum; pedes modici, femoribus modice incrassatis (posticis quam anteriores paullo magis, illis prope apicem dente acuto armatis), tarsis modice elongatis (fere ut *Diaphanopis*), robustis, articulo basali quam 2us parum longiori, unguiculis simplicibus; abdominis segmentum basale quam 2—4 conjuncta parum brevius.

Nearest I think to *Diaphanops* of described genera, beside which it would stand in M. Lacordaire's arrangement as a member of the "Groupe" *Carpophagites*, on account of the greatest width of its prothorax being at the base of that segment. In that "Groupe" it differs from *Carpophagus inter alia* by its prosternum not prominent behind the coxæ and its very much less dilated femora, and from *Diaphanops* by its head not rostriform in front, transversely oval eyes, and much longer antennæ. Its elytra (of ordinary length but) dehiscent almost from the base in both sexes, and strongly depressed distinguish it at once from all described Australian genera of *Sagrides*. Its ligula is of the *Sagrid* type. The upper surface of the typical species is pubescent (rather closely on the prothorax and head, very sparsely on the elytra), and the under surface is densely so. The facies, and especially the colours and markings, are suggestive of *Polyoptilus*, but I do not look upon that genus as at all closely allied structurally to the present one.

N. Frogyatti, sp. nov. Niger, antennis (articulis basalibus 3 exceptis) tarsisque rufis, elytris flavo-variegatis; minus nitidus, capite prothoraceque confertim subtiliter aspere punctulatis; antennarum articulis 1° sub-globoso, 2 perbrevi, 3° quam 1us 2us que conjuncti vix breviori obovata, 4° quam 3us vix breviori subtriangulari fere transverso, 5° quam 4us parum longiori, 4°—11° gradatim longioribus; prothorace leviter transverso sub-cylindrico, ad basin dilatato, lateribus leviter sinuatis; elytris sparsius subfortiter nullo modo seriatim punctulatis, sutura manifeste carinata.

Maris antennarum articulis 4—10 manifeste compressis, articulo apicali breviter appendiculato deformi (sc. inæquali versus apicem tuberculo magno mamillato et tuberculis nonnullis minoribus armato.)

Fem. antennarum articulis 4—10 leviter compressis, ultimo breviter appendiculato. Long., 5 l. ; lat., 2 l. (vix).

Evidently variable in the markings of its elytra. I have before me three examples, no two of which are quite alike. In one of them the elytra may be described as bright yellow with the suture narrowly black for a short distance behind the base, this narrow black suture suddenly and squarely dilating about halfway between the base and the middle of the elytra into a very wide common sutural vitta and then dilating again about halfway between the middle and apex of the elytra to occupy the whole apex. The apical black is narrowly produced up the lateral margin nearly to its middle and then turns inward on the elytron and joins the sutural vitta, so as to enclose a large yellow spot. There is also an oblique black dash running hindward and sutureward (but not reaching the suture) from the lateral margin near its front. In another example the base of the elytra is narrowly black, and the oblique dash is continued so as to connect with the front margin of the transverse connection between the sutural vitta and the black part of the lateral margin. The third example is like the type, except that the connection between the sutural vitta and the black part of the lateral margin is wanting.

N.W. Australia ; sent by Messrs. Froggatt and Masters.

POLYOPTILUS.

It appears to me doubtful whether all the species that have been attributed to this genus are really congeneric, but there certainly seem to be serious difficulties in the task of separating them, inasmuch as there is only one of them (*P. Lacordairei*, Germ.) of which both sexes are known with certainty. At present, therefore, it seems well to regard the genus as distinguished from other described Australian *Sagrides* by the following characters in combination ; metasternum not prominent between the intermediate coxæ (as it is in *Mecynodera*), elytra not spiniform at apex (as they are in *Ametalla*), prothorax not at its widest at the base (as it is in *Carpophagus*, *Diaphanops*, *Pseudotoxotus*, and *Neodiaphanops*), mandibles not bifid at the apex (as they are in *Cheiloxena*), apical joint of maxillary palpi not securiform (as it is in *Megamerus*), hind femora not unarmed in combination with normal elytra (as they are in *Prionesthis*), eyes not depressed (as they are in *Duboulayia*), tarsi not short and having their basal three joints equal or nearly so, *inter se* (as

they are in *Coolyardica*). Species referable to *Polyoptilus* by the characters indicated above, and not distinguishable by any well-marked and obviously generic character from the species already attributed to that genus, seem to me best placed for the present in *Polyoptilus*. I make the above remarks with a view to describing two new species of *Sagrides*, which were taken in Tropical Queensland by Mr. Koebele, and which certainly do not seem to a casual glance congeneric, *inter se*, and yet one of them is evidently closely allied structurally to *P. Lacordairei*, Germ., and the other to *P. Ericksoni*, Germ. They differ from all the known Australian *Sagrid* genera, except *Polyoptilus*, as I have noted above that *Polyoptilus* does, and I fail to discover in them any well-marked structural character that would decidedly separate them from both the species of *Polyoptilus* named above.

I may perhaps remark in passing that the description of *Polyoptilus pachytoides*, Baly, reads in some respects as if it might have been founded on a female example of the genus described above as *Neodiaphanops*, although I find it difficult to believe that if that had been the case Mr. Baly would have referred the insect to *Polyoptilus*.

P. costatus, sp. nov. Sat parallelus, modice elongatus; ferrugineus, elytris (margine angusto ad suturam et ad latus excepto) dilutioribus; capite crebre fortius punctulato; antennis quam corpus vix brevioribus, articulis 2° perbrevi 3° quam 2us duplo longiori (his conjunctis 1° æqualibus) 4° quam 1us vix longiori 5° quam 4us vix longiori 5°—11° gradatim longioribus; oculis prominentibus grosse granulatis (ut *P. Lacordairei*); prothorace cordato, leviter transverso, sat crebre (quam *P. Lacordairei* magis crebre) subfortiter punctulato, mox ante basin constricto, lateribus ante medium fortiter rotundatis; elytris costis 4 (his bene definitis et ante apicem obsoletis) instructis, interspatiis et parte apicali sat crebre subfortiter punctulatis; tarsis quam *P. Lacordairei* paullo minus elongatis; corpore subtus pubescenti; femoribus posticis subtus (sicut *P. Lacordairei*) armatis. Long., $4\frac{4}{5}$ l.; lat., $1\frac{3}{5}$ l.

The prothorax is notably longer than wide in all the previously described species except *Ericksoni*, Germ., and *Waterhousei*, Baly, the former of which however has antennæ not much more than half the length of the body their third joint being very little shorter than the fourth, while the latter has punctulate-striate non-costate elytra. Its strongly prominent eyes (with their hind outline, viewed from above, forming a right angle with the lateral outline of the head), elongate antennæ, pubescent under surface, and comparatively slender build connect this species much more closely with *P. Lacordairei* than with

P. Ericksoni. From *P. Lacordairei* it is abundantly distinct (apart from its very different colouring) by, *inter alia*, its short prothorax, and elytra with strongly defined (quite costiform) elevated lines.

N. Queensland.

P. torridus, sp. nov. Robustus, sat latus; piceus, antennis palpis tarsisque dilutioribus; capite et prothorace confertim fortiter subrugulose punctulatis; antennis quam corporis dimidium vix longioribus, articulis 2° brevi, 3° quam 2us duplo longiori, 4° quam 3us longiori (1° longitudine sat æquali), 5° 4° sat æquali, 6°—10° brevioribus inter se sat æqualibus, 11° 4° longitudine sat æquali; oculis sat parvis sat prominulis, grosse granulatis; prothorace quam longiori vix latiori, cordato, lateribus ante medium fortiter rotundatis, margine antico nonnihil elevato ad latera subangulato; elytris lineis subelevatis 4 (his postice abbreviatis) instructis, interspatiis et parte apicali crebrius subfortiter punctulatis; femoribus posticis subtus (sicut *P. Lacordairei*) armatis, tarsis sat brevibus (quam *P. Ericksoni* paullo brevioribus); corpore fere glabro. Long., 6 l.; lat., 2¼ l.

This species is of very robust build, even more so than *P. Ericksoni*, Germ.; its antennæ and tarsi, moreover, are distinctly shorter than in that species When both sexes of the species now attributed to *Polyoptilus* are known I cannot but think it probable that *Lacordairei* and *Ericksoni* will be found to be generically distinct from each other, and if so I suspect that the present species will have to be placed in a third genus. It has the nitid glabrous undersurface as well as the robust build and short antennæ and tarsi of the *Ericksoni* type, but its eyes are of the *Lacordairei* type. If it should be found that the female of *Ericksoni* has short elytra and unarmed hind femora (as in *Lacordairei*) no doubt the two might stand as extreme forms of a single genus, but I am of opinion that I have both sexes of *Ericksoni* and that the female differs very little from the male externally, being however somewhat larger and having the front tarsi more slender. I can, however, find no satisfactory character to separate the present insect from *Polyoptilus* regarded as including both *Lacordairei* and *Ericksoni*.

N. Queensland.

EDUSA.

E. puberula, Bohem. In Tr. Roy. Soc., S.A., 1891, I furnished a paper on *Edusa* containing a tabulation of the species known to me. In that paper I mentioned *E. puberula* as one that I had not been able to identify. Since that time I have collected in the Blue Mountains, and also received from Mr. Froggatt, an *Edusa* which I have no doubt is that insect. In my tabulation

it would stand (*loc. cit.*, p. 143) beside *bella*, Blackb., from which it differs *inter alia* by its considerably larger size and more robust legs, and by its head not having a well marked longitudinal impression on the vertex (as *bella* has) but only a very fine (almost scratch-like) frontal stria.

E. viridicollis, Lef. Since writing the above-mentioned paper I have collected this species also, and have received it from Mr. Jacoby and from the Chapuis collection. In my tabulation of *Edusa* (*loc. cit.*) it would stand beside *E. lineata*, Blackb., from which it is distinguishable *inter alia* by its much larger size, very different colouring, and its hind tibiæ in the male strongly curved at the apex.

PSEUDOPAROPSIS (gen. nov. *Chrysomelidarum*).

Palpi maxillares breves, articulo ultimo subovali apice angustato quam præcedens sublongiori; oculi oblongo-ovales, subtilius granulati; antennæ breves (speciei typicæ articulis 7—10 sat fortiter transversis); prothorax brevis; elytra conjuncta quam longiora sat latiora, epipleuris (ut *Paropsidarum* normalium, e.g. *punctata*, Marsh) altera parte alte erecta altera (antice latissime) horizontali; prosternum inter coxas minus angustatum, postice dilatatum, in medio inter coxas carinatum utrinque sulcatum (sicut *Paropsidarum* plurimarum, e.g. *minor*, Marsh); pedes modici, tarsorum (sicut *Paropsidis*) articulo 2° quam 1us 3us que multo minori multo angustiori, unguiculis simplicibus; corpus (speciei typicæ) modice convexum, fere circularis, glabrum, *Coccinellam* simulans.

The species for which I propose this new generic name may be characterised as a *Paropsis* with the palpi and claws of a *Plagiodera*. From the latter genus it may at once be known by the small second joint of its tarsi (not more than half as wide as the third joint), and especially by the epipleuræ of its elytra, which consist of two distinct planes nearly at right angles to each other (except close to the apex of the elytra), the height of the erect part and the width of the horizontal part being in the front half of their length each about equal to the length of the second ventral segment. It seems not improbable that *Plagiodera Lownei*, Baly (of which I have not seen an example) is a member of this genus.

P. nitidipennis, Boisd. Fere circularis, minus convexa; glabra; nitida; flavo-fulva, elytris cupreis nonnihil aureo-micantibus antice et ad latera viridi-marginatis; capite brevi subtilissime punctulato, antice transversim (postice in medio longitudinaliter) sulcato; antennis brevibus, apicem versus fortiter incrassatis; prothorace quam longiori ut 7 ad 3

latiori, æquali, sparsius dupliciter (subtiliter et minus subtiliter) punctulato, angulis omnibus rotundatis; elytris sparsim punctulatis (horum puncturis prothoracis puncturis majoribus similibus). Long., $2\frac{1}{2}$ l.; lat., $2\frac{2}{5}$ l.

The very brief description of *Chrysomela nitidipennis*, Boisd., reads as if it might well have been founded on this species, especially in consideration of Boisd. referring to the small size of the insect before him in comparison with the other Australian *Chrysomelæ* that he described. In describing *Plagiodera Lownei* Mr. Baly does not refer to that insect as differing structurally from typical species of *Plagiodera*,—so that very likely the present insect has nothing to do with it; nevertheless his description (apart from that obstacle) reads much like that of a species resembling that I am now describing. If it should be generically identical Mr. Baly's species differs specifically from mine by the black apex of its antennæ and back of its head, the dark colouring of part of its under-surface, the (implied) absence of green margin on its elytra, its prothorax more than three times as wide as long, and bearing fovea-like impressions, and the lateral portion of its elytra "dilated and separated from the disc by a shallow depression."

Queensland; sent to me by Mr. Froggatt.

MONOLEPTA.

M. fasciatipennis, Blackb. I have recently taken near the original locality some more examples of this species which prove it to be variable to the extent of invalidating the character on which in my tabulation of *Monolepta* (Tr. R. Soc., S.A., 1896, pp. 100, &c.), I distinguished it from *M. picticollis*, as the elytral fascia is now found to be liable to much abbreviation at both ends. I therefore substitute the following for the distinction that was printed (*loc. cit.*, p. 100) in the tabulation:—

E. Sulcus between the eyes (looked at obliquely from behind) strongly curved (with its convexity directed forward) ... ... *fasciatipennis*, Blackb.
EE. Sulcus between the eyes (looked at obliquely from behind) straight ... ... *picticollis*, Blackb.

From whatever point of view the frontal sulcus is looked at it is seen to be quite different in the above two species, but as its shape looks a little difierent in each according to the point of observation, I have selected a particular point of view for characterising it,—viz., that from which its hind edge is most conspicuous. It is also to be noted that looked at from the above-mentioned point of view the space in front of the sulcus is seen to be in *fasciatipennis* (but not in *picticollis*) broken up into about three quasi-tubercles. In my description of *P. picticollis* I

have called the head "arcuatim" sulcato (which it is when regarded obliquely *from in front*),—but from a similar point of view the *sulcus* in *fasciatipennis* is seen to be *very much more strongly* arched still. The two species, moreover, are very different in colour and markings, although the particular marking I emphasised in my tabulation now proves to be unreliable as a sharp distinction.

On Some Older Tertiary Fossils of Uncertain Age from the Murray Desert.

By Professor Ralph Tate.

[Read June 6. 1899.]

Plate I.

A small collection of fossils in an excellent state of preservation, though more or less bleached, was submitted to me in 1886 ; of the species which were in duplicate I was permitted to retain an example. The list of species, then compiled, has since been lost, so that now I have only actual knowledge of those retained for the University Museum. Some of these species are referred to in my Monographs as coming from a deep well on Cooke's Plains or Murray Desert. It is only recently, though, after many futile attempts, that I have received authentic information of the locality whence the fossils were obtained. My informant, Mr. L. Salter, of Angaston, writes me, March 3, 1899—"Mr. Smith says that the fossils came from the bottom of a deep well at a place called Tareena, on the Murray, in New South Wales, just across the Victorian border."

To add to my perplexity, I recognised in the Museum of Way College an identical set of fossils, both in regard to species and condition of fossilization. Through the kind services of Dr. Torr, these fossils have been traced to their source. Firstly it was stated "that they were dug up at Nildottie, somewhere near the Wow-Wow Plains, about 25 years ago, by his (the pupil's) grandfather. The well was sunk afterwards to a thousand feet in depth." In a later communication, January 4, 1899, Dr. Torr writes—"The well from which the fossils were taken is at Mindarie, about 80 miles south-east of Swan Reach." And since then Dr. Torr has submitted to me a further batch of the same sort of fossils.

The two localities must be at least eighty miles to the eastward of the easterly scarp of the Eocene Plateau at Overland Corner. There is nothing improbable that the topographic positions are

correct, though I am still unconvinced that the two set of fossils did not come from the same place or within reasonable contiguity; so much alike are they, that it may be said that they are duplicates.

The remarkable diversity of composition and mechanical condition of the Older Tertiary rocks make it possible in the majority of cases to refer specimens to their original site. Table Cape fossils are distinctive; so also are those from Spring Creek, River Murray Cliffs, Aldinga Bay, and so on. It is only in the case of the fossils of the soft clays, or those of the friable polyzoal limestones that localities cannot safely be assigned. The fossils from the Murray Desert do not resemble those of any known locality yielding Older Tertiary fossils. But they do resemble those of the Pliocene beds in the Dry Creek and Croydon bores, near Adelaide; the similitude being heightened by the common occurrence in the Murray Desert horizon of some of the most abundant fossils in the Pliocene beds obtained from the bores just named. However, the Tareena collection from the Murray Desert was in my hands four years before the bore at Dry Creek revealed the concealed fossiliferous bed of Pliocene age, which fact dispels any doubt as to such being a source of supply; moreover, the white calcareous sand forming the matrices of the Murray Desert fossils is so largely admixed with grains of glauconite as to impart a pepper-and-salt coloration to the whole. This is distinctive.

The main point of interest about these fossils is the uncertain data they afford as to their horizon; and the interest therein has been increased through certain correlative discoveries made of late, such as the occurrence of certain so-called Eocene fossils in the Pliocene of the Dry Creek bore, that of characteristic Miocene species in Eocene beds, and the indications at the Murray Desert and some other localities in Victoria and Tasmania of a fauna intermediate between typical Eocene, such as Muddy Creek, and typical Miocene, such as around the Gippsland Lakes.

Though the age of the Murray Desert fossils is not actually assigned in my earlier Monographs, yet Eocene is implied; but in my last one, Part IV., Gasteropoda, 1893, I remark under *Natica gibbosa*, "the age is doubtfully Miocene." The additional material brought to my notice by Dr. Torr raises the total of species from 27 to 40, and the number is sufficiently great to permit of an attempt to correlate the fauna with those of other localities and horizons.

List of Murray Desert Fossils.

Index to Locality - numbers.—1. Aldinga Bay; 2. River Murray Cliffs; 3. Muddy Creek; 4. Gippsland Lakes; 10. Beaumaris (Cheltenham and Mordialloc); 11. Spring Creek; 12. Table Cape; 13. River Murray Cliffs; 15. Muddy Creek; 19. Geelong; 20. Mitchell River; 21. Camperdown.

Species.	Tarcena.	Mindarie.	Other Occurrences.
*Oculina, *n. sp.*	*		Nil.
Pecten yahlensis, *Woods* ...	-	*	Eoc., *passim*, 10, 12
Hinnites corioensis, *McCoy* ...	-	*	Eoc., 12, 13, 19, 20
Axinæa convexa, *Tate* ...	*	*	Eoc.,13; Mioc.,1, 2, 3; O. Plioc.
Cucullæa corioensis, *McCoy* ...	-	*	Eoc., *passim;* 10, 11, 12; Mioc., 1, 2, 3, 4; O. Plioc.
Crassatella oblonga, *Woods* ...	*	*	10, 12; Mioc., 1, 2, 4
Mytilicardia compta, *Tate* ...	*	-	Eoc., 12, 15; Mioc., 2, 3
Cardita calva, *Tate*	*	-	10; Mioc., 2, 3
Trigonia intersitans, *Tate* ...	*	-	Maude
" acuticostata, *McCoy* ...	-	*	10; Mioc., 1, 2, 3, 4
Protocardium hemimeris, *Tate*	*	-	Eoc., *passim;* 12
Chione dimorphophylla, *Tate* ...	-	*	Eoc., 13, 15; 10
Meretrix submultistriata, *Tate*	*	-	10, 12; Mioc., 3, 4
Dentalium Mantelli, *Zittel* ...	-	*	Eoc., *passim;* 11, 12
*Murex biconicus, *Tate*	*	-	Nil.
Lampusia armata, *Tate* ...	*	*	Older Pliocene
*Fusus trivialis, *n. sp.*	-	*	Nil.
Columbarium craspedotus, *Tate*	*	*	Eoc., *passim;* 12
*Tudicula costata, *Tate*	*	-	Nil.
*Voluta capitata, *Tate*	*	*	Nil.
* " tabulata, *Tate*	*	*	Nil.
" uncifera, *Tate*	-	*	Eoc., 13
" strophodon, *McCoy* ...	*	*	Eoc., *passim;* 12
*Volutilithes antispinosus, *n. sp.*	*	*	Nil.
*Mitra diductua, *n. sp.*	*	*	Nil.
Ancilla hebera, *Hutton*	*	*	Eoc., *passim*, 10, 11, 12; O. Plic.
*Harpa cassinoides, *Tate* ...	*	*	Nil.
*Terebra angulosa, *Tate*	*	*	Nil.
*Cassis contusus, *n. sp.*	-	*	Nil.
*Semicassis radiatus, *Tate* ...	*	-	Nil.
" transennus, *Tate* ...	-	*	Eoc., *passim;* 12
Pelicaria coronata, *Tate* ...	*	*	12; Mioc., 2, 3, 4; O. Plioc.
*Cypræa amygdalina, *Tate* . .	*	*	Nil.
*Surcula Vardoni, *n. sp.* ...	*	*	Nil.
Bathytoma Pritchardi, *Tate* ...	*	*	Mioc., 4
Natica gibbosa, *Hutton*... ...	*	*	O. Pliocene
Turritella tristira, *Tate* ...	*	*	Eoc., 19, 21; 10, 12; Mioc., 4
" acricula, *Tate* ...	-	*	Eoc., *passim;* 10, 11, 12; Mioc., 4
Cerithium Torrii, *n. sp.* ...	*	*	Nil.
" Pritchardi, *Harris*...	*	-	12
Total species, 40	28	30	18 in common

Fifteen species are peculiar. These are indicated by a prefixed asterisk in the foregoing list. Of the twenty-five common to other localities and horizons, ten are Eocene, not passing into undoubted Miocene. *Axinœa convexa*, *Crassatella oblonga*, and *Pelicaria coronata* are characteristic Miocene species, the first and third passing to Older Pliocene. *Lampusia armata* and *Natica gibbosa* are common shells in O. Pliocene. *Cucullœa Corioensis* is equally common at Eocene and Miocene horizons, and passes to Older Pliocene. *Ancilla hebera* is Eocene and Pliocene. *Mytilicardia compta*, *Turritella tristira*, and *T. acricula* are Eocene and Miocene, the first uncommon in both. *Meretrix submultistriata* is a somewhat characteristic Miocene species, but is not known at undoubted Eocene horizons. *Bathytoma Pritchardi*, *Trigonia acuticostata*, and *Cardita calva* are Miocene only. *Trigonia intersitans* was previously only known from Maude in the Moorabool Valley.

It is noteworthy that *Crassatella oblonga*, *Cardita calva*, *Trigonia acuticostata*, *Meretrix submultistriata*, and *Pelicaria coronata*, which are characteristically Miocene, have been quoted as Eocene from their occurrence at Beaumaris (Cheltenham), Spring Creek, or Table Cape ; and, also, that others having a wide geographic range and passing up from the Older to Newer Tertiary are met with at one or more of the three named localities.

The collection of Murray Desert fossils includes several Eocene species which are not known at higher levels, and a fair number of Miocene species which do not occur at lower horizons, except the horizon represented by localities 10, 11, and 12, but some of which are also Pliocene shells. As a whole, the collection has considerable affinity with the faunas at Beaumaris and Table Cape, which with that of Spring Creek indicate a higher horizon than that of the typical Eocene localities. The Beaumaris fauna is not typical Miocene, despite Messrs. Hall & Pritchard's (*) endeavors to prove it so ; I have knowledge of a much fuller record of species than they have given, and an analysis of the evidences they afford may eventually be submitted ; however, I have always admitted that the fauna is a passage one from Eocene to Miocene. At present the stratigraphical relations of the beds yielding this intermediate fauna at these localities to the Eocene are not yet defined, though there is good ground for the opinion that the Beaumaris beds are superior to the Eocene.

In the case of the two Murray Desert localities, the position is paradoxical ; the fossils indicate a younger age than the Eocene deposits which prevail along the line of the River Murray from

*Trans. R. Soc., Vict., IX. (N.S.), 1896.

Lake Alexandrina to Overland Corner, and form the southern boundary of the Desert, which is more or less deliminated by the railway line from Murray Bridge to Tintinarra. Several deep wells on this route reveal at depths, corresponding with those at which the fossil beds were reached at Tareena and Mindarie, either the prevailing calciferous sandstone of the River Murray cliffs, or an earlier, more or less argillaceous formation corresponding with the basal beds of the Aldinga section.* Whilst, further deep-seated Eocene strata extend into New South Wales, as proved by the occurrence of *Trigonia semiundulata* at a depth of 647 feet in the Arumpo bore, situate in the angle formed by the junction of the Darling and Murray rivers.†

Tareena and Mindarie are situated at about fifty miles to the eastwood of the meridian of Overland Corner, which so far as known demarks the eastern escarpment of the River Murray plateau, composed above the river-way of Eocene calciferous sandstone capped by Miocene sands and oyster-banks. Between Overland Corner and the confines of South Australian territory, Newer Tertiary lacustrine beds occupy the surface. Therefore, the fossiliferous beds beneath these at Tareena and Mindarie should be older than the River Murray Eocene-limestones (on the assumption that surface levels are approximately the same, and that the Eocene beds have little or no inclination, which I believe to be the case), or it may be that extensive erosion has removed the Eocene strata, which have been replaced by a younger deposit, similar to the Tintinarra section, where a Pleistocene deposit (containing a great variety of recent species) fills a north and south trough in the Eocene beds to a depth beneath the surface of 154 feet.‡ The rejection of this latter explanation will involve the acceptance of a very prolonged vertical range for a considerable number of species, and thus do violence to the evidence of a restricted range for the vast majority of the Eocene mollusca.

The opinion that our Pre-Miocene deposits are not all synchronous may be gathered from the "Correlation" papers contributed by myself in collaboration with Mr. Dennant, though as yet no scheme of succession had been submitted. Aided since by extended palæontological studies, I have ventured to submit, perhaps prematurely, the following schedule showing the chronological sequence of the chief fossiliferous developments.

Clark, Tr. Roy. Soc., S. Aust., vol. XX., p. 110, 1896; *Tate*, id., vol. XXII., p. 197, 1898.

†*Etheridge*, Records Geol. Surv., N.S.W., vol. III., p. 115, 1893. (On examination of the fossil I have confirmed the specific determination.—*R.T.*)

‡*Tate*, T., Roy. Soc., S.A., vol. XXII, p. 65, 1898.

SUCCESSION TABLE OF PRE-MIOCENE TERTIARY BEDS.

POST EOCENE (? *Oligocene*).

Beaumaris (Cheltenham), Murray Desert, Table Cape, and Spring Creek.

UPPER EOCENE.

Muddy Creek, Gippsland Rivers, River Murray, around Port Philip, Gelibrand River, and upper part of Lower Aldingian Series.

MIDDLE EOCENE.

Cape Otway and middle section of Lower Aldingian.

LOWER EOCENE.

Chalk of the Great Australian Bight, lower part of Lower Aldingian Series, and Croydon Bore.

PALÆONTOLOGICAL NOTES.

Fusus trivialis, *spec. nov.* Plate i., fig. 4.

This species is represented by an imperfect specimen, wanting the greater part of the spire. It resembles *Fusus Johnstoni*, as illustrated in my "Gasteropods," Part I., t. 12, fig. 4*a* (a young shell), and indicates a total length of 44 mm., and a width of body-whorl of 20 mm. It differs by fewer and stouter spiral threads, three or four on the antesutural slope, the whorls not so angulated, the peripheral tuberculations more dentiform and larger, and the snout much more robust.

Volutilithes antispinosus, *spec. nov.* Plate i., figs. 5 *a*, *b*.

It resembles the short-spired form of *V. antiscalaris*, but has not the antesutural corona, and the adjacent whorls are flush, the spinous tubercles are fewer (eleven on the body-whorl), and more prominent. Its shape is more pyriform, and by reason of the more precipitous post-peripheral slope and the relatively wider periphery the aperture is more markedly trapezoidal. The posterior half of the anteperipheral area of the body-whorl is smooth. In this and some other respects this new species is the analogue of *V. spinosus*, Lamarck, but it is larger and less acute.

In my "Gasteropods," Part II., p. 134, *V. anticingulatus* is recorded from Murray Desert; the specimen which served for that determination is not accessible to me, but, it is probable, it belongs to *V. antispinosus*.

Dimensions.—Length, 48 mm.; width, 24 mm.

Mitra diductua, *spec. nov.*

M. dictua, Tate, Trans. Roy. Soc., S. Aust., vol. XI., p. 138, t. 4, 9, 1889 (non. Ten.-Woods.)

The fossil figured by me, as quoted above, is from Murray Desert, though the description was drawn-up from a Muddy Creek authentic example of *M. dictua*, Ten.-Woods. A re-examination of the Tareena specimen, aided by others since acquired from Mindarie, satisfies me that my original determination is wrong; that the Murray Desert shell is distinct from *M. dictua*, from which it differs by more cylindric shape and by the earlier whorls being without ornament.

A similar species to the foregoing occurs in the Pliocene of the Dry Creek and Croydon bores, near Adelaide; which is distinguished from *M. diductua* by an antesutural sulcus, more or less punctuated, posterior to which there may be one or two linear sulcations (5 exs.); I name it *M. fodinalis*.

M. uniplica, *M. dictua*, *M. diductua*, and *M. fodinalis* are typical Mitræ, constituting a group characterized by ill-developed or obsolete anterior columella-plications.

Ancilla hebera, *Hutton.*

The fossil referred to as *A. pseudaustralis*, *var.*, in Trans. Roy. Soc., S. Aust., vol. XI., p. 148, t. 6, f. 13., I now consider to be an extremely large senile form of *A. hebera* (Three senile examples of varying size from Murray Desert).

Cassis contusus, *spec. nov.* Plate i, fig. 1 *a*, *b*.

This fossil is of the same shape as *C. exiguus*, though the apex is more slender and apiculate. The last whorl has three rows of nodulations, the posterior one is continuous to the labrum, the middle row does not reach so far, whilst the anterior row fades away at about the half distance between the last varix and the labrum. The posterior row of nodulations are fewer (fourteen) than in *C. exiguus*, and the antesutural crenatures are much wider than in that species. Whilst in the allied species the ornamentation consists of strong axial threads crossed by revolving striæ; in *C. contusus* the axial ornament consists of irregular wrinklings, whilst the middle line of the interspaces between the nodulate rows is occupied by two or three spiral rows of impressions varying in outline from circular to rhombic; a similar ornate band is anterior to the third nodulate row, and again around the base posterior to the snout.

Dimensions.—Total length, 53 mm.; length of spire, 7 mm. peripheral diameter, 40 mm. Type unique. University Museum.

Surcula Vardoni, *spec. nov.* Plate i., fig. 3 *a*, *b*.

Fusiform; spire pyramidal, acute, nearly as long as the aperture, terminating in a small obtuse pullus of two smooth whorls, the tip of which is laterally immersed. Ordinary spire-whorls six, separated by a linear suture, flatly convex; the earlier whorls medially carinated or bicarinated coincident with the

fascia, and with fine spiral threads, more or less squamose by intersection with the growth striæ, above and below the fascia.

Body-whorl flatly convex, somewhat abruptly contracted into a moderately short, wide, shortly upturned canal. The fascia is 1·5 mm. wide, and is post-peripheral, but widely separated from the suture; the post-fascial area is nearly smooth, the spiral and axial ornament of the earlier whorls being almost obliterated; the anteperipheral area is furnished with about five stout subacute spiral ribs, the interspaces spirally lined; the same kind of ornament, with weaker spiral ribs, but with more pronounced squamose spiral striæ, is continued on to the base and snout.

Aperture narrowly pyriform, outer lip thin, sinus apparently broad and short.

The species would appear to be common at both localities.

Dimensions.—Length, 38·5 mm.; width, 16 mm.; length o aperture, 24·5 mm.; and width, 6 mm.

The species-name is a compliment to Mr. Joseph Vardon, J.P., whose invaluable aid to the Council in his capacity of printer of the Transactions since 1879, is hereby personally acknowledged by me.

Remarks.—Among described species of the Australian Terriaries, this new form makes a near approach to *P. paracantha*, Ten.-Woods, from which it differs by more conoidal shape, the absence of tubercles on the keel, and by having strong spiral ribs on the body-whorl. I consider the two species to be congeneric; they both have the aspect of *Bathytoma*—indeed, I had referred last year* *P. paracantha* to *Bathytoma*—but the columella-plication is not developed, though there is a faint twist of the pillar. Whatever may be more correct generic location, there is no doubt that these two species abbreviate the differences which separate the one genus from the other.

Cerithium Torrii, *spec. nov.* Plate i., fig. 2.

Shell cylindroid-turreted, fully five times as long as wide. Whorls flat, slightly imbricating at the suture, ornamented by stout, subactue, subflexuose axial ribs about twenty-four on each of the six anterior whorls; the ribs are interrupted at about one-fifth the breadth of the whorl from the posterior suture by a linear series of contusions in the interspaces, and the more anterior whorls are crossed by two or three slightly elevated spiral threads, which are feebly tuberculated at the intercrossing with the axial costæ. The whole surface of each whorl is closely and minutely reticulate-lined.

Dimensions.—The two examples under observation are imperfect, both are wanting the apical part of the spire and the body

* Proc. Roy. Soc., N.S.W., p. 398.

whorl. The less incomplete specimen has ten whorls in a length of 130 mm., and a maximum width of 31 mm., by estimate the total length is 160 mm. The other specimen has five and a-half turns in a length of 82 mm., including canal, with a breadth of 32 mm.

Remarks.—I do not know of any species of Cerithoid shell, recent or fossil, with which to compare *C. Torrii*; the imperfection of the anterior part of the shell does not permit of an exact generic reference, though probably it may be to *Potamides*.

The species name is in compliment to my malacological confrere, Dr. Torr, whose assistance has so ably and heartily been given in furtherance of the present communication.

Crassatella oblonga, *Ten.-Woods.*

The Murray Desert fossil, of which several examples have been under observation, is absolutely identical with the type shapes of the species so common at Table Cape, but the application of this name to specimens of *Crassatella* from the Pliocene of the Dry Creek Bore is wrong.

Chione dimorphophylla, *Tate*, or *sp. n.*

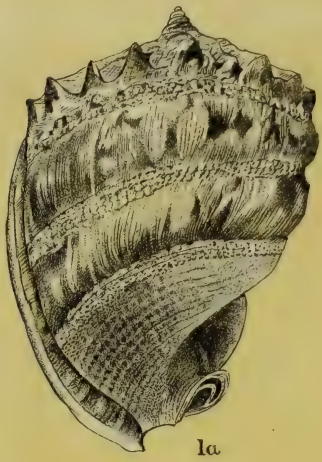
A unique example of a right valve of a Chione, though it much resembles *C. dimorphophylla* yet differs from that species sufficiently to suggest the probability of its specific distinctness; but the possibility that the differences may represent extreme individual variation induces me to a non-committal course.

As compared with the type, the ventral margin is more arched. the radial threads coarser and the concentric frills somewhat fewer (those of the medial region thick and obtuse, not thin and retroverted).

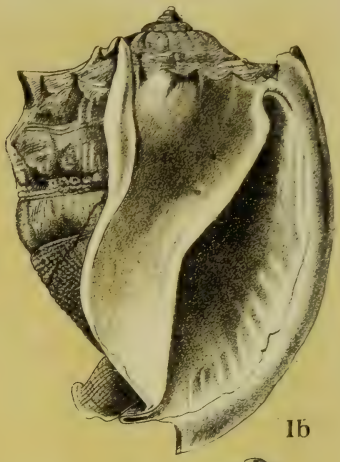
SUPPLEMENTAL NOTE ON THE FORAMINIFERA.

By Walter Howchin, F.G.S.

Triloculina trigonula, *Lamk.*
Miliolina cuvieriana, *d'Orb.*
" oblonga, *Montag.*
" seminulum, *Linn.*
" venusta, *Kar.*
Planispirina agglutinans, *d'Orb* (sp.)
Reophax, sp.
Clavulina angularis, *d'Orb.*
Lagena lævis, *Mont.*
" striata, *d'Orb.*
" sulcata, *W. & J.*
Nodosaria scalaris, *Balsch.*



1a



1b

3

3b

4

5a

2

5b

F.B lith.

VARDON & PRITCHARD

Cristellaria, sp.
Polymorphina communis, *d'Orb.*
" elegantissima, *P. & J.*
Discorbina orbicularis, *Terq.*
Truncatulina margaritifera, *Br.*
" ungeriana, *d'Orb.*
Pulvinulina elegans, *d'Orb.*
Polystomella crispa, *Linn.*
" macella, *F. & M.*

The commonest species in the material is *Polystomella macella*, but the examples exhibit feeble development which may have been caused by unfavourable conditions. The list is not in any way distinctive, the occurrences being of species which have a wide distribution, but has perhaps a closer affinity to the Older rather than the Newer Tertiaries. Of the ten species of Foraminifera observed from the Dry Creek Bore (Older Pliocene), only two are represented in the above lists. The material was, however, widely different in each case, that from Dry Creek being somewhat coarse quartzose sand, whilst that now reported upon was fine and calcareous.—W. H.

The paucity of numbers of species may be accounted for by the very small quantity (a thimbleful) of material submitted for examination.

EXPLANATIONS TO PLATE I.

Figs.
1, *a.b. Cassis contusus*; two views, nat. size.
2. *Cerithium Torrii*, nat. size.
3. *Surcula Vardoni*; *a*, nat. size; *b*, enlarged view of protoconch.
4. *Fusus trivialis*, nat. size.
5, *a.b. Volutilithes antispinosus*; two views, nat. size.

Descriptions of New Species of Corals from the Australian Tertiaries.

By J. Dennant, F.G.S., Hon. Fellow.

Part I.

WITH PLATES II., III.

[Read June 6, 1899.]

It will, I think, be ultimately found that the Australian Tertiaries are specially rich in corals. So far nearly 60 species have been described, almost solely by Professor M. Duncan and the Rev. J. T. Woods, but the unnamed ones in collectors' hands are still numerous.

In addition to my own gatherings, the material available includes contributions from Professor Tate and Mr. J. Mulder, who have generously allowed me to select what I chose from their cabinets.

A revision of the forms described by previous authors is also desirable, and will be undertaken when further examples of the various genera represented have been discussed.

In the present paper I deal with seven species, which are included under five genera and two families.

FAMILY TURBINOLIDÆ.

Genus Flabellum.

Flabellum Gippslandicum, *spec. nov.* Pl. ii., figs. 1 *a*, *b*.

The corallum is compact in substance, of varying height, sometimes tall in relation to its breadth, straight, much compressed, and wedge-shaped. The sides are rounded and slightly inclined to the base, the angle subtended being about 10°. The anterior and posterior surfaces are flattened, and also inclined to each other at a similar angle. The base is crescent-shaped and much eroded; not unusually the horns of the crescent are slightly prolonged outward.

The calice is shallow and elliptical, with the plane of the shorter axis somewhat higher than that of the longer; the two axes of the ellipse are as 100 to 44. There are five cycles of septa with six systems, of which only the two central ones are complete; in the figured calice the septa number 76. The first three orders are stout and equal; the higher orders diminish both

in length and thickness, the fifth being very short and thin. All the orders are wavy, and, with the exception of the highest, show several radiating rows of granules on their sides.

The fossa is long, narrow, and abruptly descending. Most specimens have the wall of the corallum broken off level with the columella, which is formed by the fused ends of the principal septa; but in more perfect examples the columella is either not visible or can be just seen deep down in the fossa.

The costæ are subequal in size, closely-set, and correspond to the septa. As a rule, they are almost concealed by the epitheca, but when this has been worn off by fossilization they are distinct on the sides of the corallum. In well-preserved examples the epitheca is dense, and shows chevron-marked ridges running parallel with the convex calicular margin.

Height of corallum (figured example), 31 mm.; length of calice, 16 mm.; breadth of calice, 7 mm.

Locality.—Abundant in the Miocene beds of the Gippsland Lakes area, Victoria.

This coral is allied to *F. Victoriæ*, Duncan, but is more compressed and much larger. It has besides an extra cycle of septa.

Flabellum fastigatum, *spec. nov.* Pl. ii., figs. 2 *a*, *b*.

The corallum is elliptico-conical in shape, and tapers regularly from the summit to a very small pedicel at the base. The angle subtended by the lateral borders of the corallum is about 30°, and that by the middle line of the faces about 18°. The calice is elliptical and deeply excavated. The two axes of the ellipse are as 100 to 56.

The septa are slender and straight; they have dentated edges, and their sides are ornamented with rows of small rounded granules. They are in six systems, with four cycles. The two central systems only are complete, those at the ends wanting either a secondary or tertiary, and also one or more of the quaternary septa. The primaries, secondaries, and tertiaries are well developed and equal; the quaternaries are nearly as long, but thinner and less prominent from the wall. The inner borders of the principal septa are perpendicular, and enclose a narrow, deep, and elongate fossa, at the bottom of which is the columella; this is formed by the thickened and fused ends of the septa of all four orders. Only one of my examples shows a deep central fossula in the calice, the others, as is frequently the case with fossil Flabella, having the corallum broken off or worn to the level of the columella. The wall is thin towards the calicular margin, but becomes stout inferiorly.

The principal costæ are prominent on the surface of the corallum as medially furrowed and slightly raised ridges, which

correspond to the three first orders of septa. There are no costæ of the fourth order. The ridges which constitute the lateral costæ are larger than the others, and can be traced almost to the terminal pedicel; two or three of those on the middle of the faces reach as far, but the remainder are successively cut off by the lateral slope of the cone. All become less conspicuous as they approach the base.

The epitheca is strong and continuous on the surface of the corallum; it forms a transverse ornament of wavy lines both on the costæ and their interspaces.

Height, 30 mm.; length of calice, 18 mm.; breadth of calice, 10 mm.

Locality.—Rare in the Eocene cliffs at Spring Creek, 13 miles south of Geelong, Victoria.

Flabellum curtum, *spec. nov.* Pl. iii., fig. 3 *a*, *b*.

The corallum is compressed, especially inferiorly, and in outline almost an equilateral triangle, of which the upper margin represents the base, and the short swollen pedicel the apex; its lateral borders are gently rounded. The calice is shallow and elliptical, the ratio of the axes of the ellipse being as 100 to 52; the plane of the shorter axis is considerably higher than that of the longer, and the summits of the faces are consequently much arched.

The septa are granulated, slightly curved, and faintly waved on their upper margins. They are in six systems, with five cycles, four only of which are developed in the end systems. Each of the latter contains two principal septa, viz., the primary and either the secondary or one of the tertiaries; the higher orders are present, but correspondingly few in number. The half calice figured shows only two quinaries in the end systems instead of four, none being developed on either side of the quaternaries which flank the middle system. In other calices examined the quinaries are present in these spaces, but are wanting on the sides of the adjoining quaternaries at the extremities of the middle system. For the three systems figured there are 28 septa, or 56 for the entire calice. The primaries, secondaries, and tertiaries are stout and equal, and bound a moderately broad and deep axial fossa; the quaternaries are nearly as long, but much thinner, while the quinaries are still smaller and very short. The inner margins of the principal septa are vertical in the fossa and strongly wrinkled; they are free for a considerable distance down, and then unite by stoutish, twisted processes to form a rudimentary columella.

The costæ are marked on the surface by broad rugose bands with narrow interspaces, and radiate from the pedicel to the arched margin. They are of equal width for their inferior two-

thirds, when the more central ones divide into pairs up to the margin, the division line between each pair being faint. The costæ visible superiorly correspond to the septa. The epitheca is rough, dense, and persistent; it forms broad convex bands here and there on the surface, running parallel with the calicular margin, and most distinct in the interspaces of the costæ.

Height, including pedicel, 11 mm.; length of calice 10·5 mm.; breadth of calice, 5·5 mm. All the examples found are practically uniform in size.

Locality.—Tolerably numerous in the Miocene beds of the Gippsland Lakes area.

Genus Placotrochus.

Placotrochus corniculatus, *spec. nov.* Pl. ii., figs. 3 *a*, *b*.

The corallum is horn-shaped, smooth, and finely pedicellate. In young specimens there is a slight constriction just above the pedicel. The wall is thin at the summit, but becomes stouter inferiorly. The epitheca is strong, and is marked by transverse wavy ridges and lines, which are most numerous in the upper half of the coral, and reach the calicular margin. The calice is shallow and elliptical, but the relative lengths of the major and minor axes of the ellipse are not constant in the species. Thus in three examples measured the axes are respectively as 100 to 64, 100 to 72, and 100 to 82.

The septa are slightly exsert and most symmetrically disposed. They are in six systems, with four complete cycles; the primaries and secondaries are moderately stout and equal, the remaining orders becoming successively smaller. Though straight as regards their main direction, the septa are strongly waved and wrinkled, especially the primaries and secondaries for the inner two-thirds of their course. Perpendicular rows of moderate-sized, pointed granules are alternately placed on either side of the septa of the first and second orders, the summit of each successive fold carrying, as a rule, a single row of granules. Occasional granules also occur on the septa of higher order.

The columella is a straight, thin, and short lamella with rounded margins, and projects distinctly from the bottom of the fossa.

The costæ correspond to the septa. The primary lateral costa on the convex curve of the corallum forms a strong well-marked ridge, which in some specimens is nodose. Other less prominent ridges mark the secondary and the remaining five primary costæ. In the spaces between the ridges, which are barely concave, the tertiaries and quaternaries are indicated by faint lines.

Height, 20 mm.; longer axis of calice (type), 9 mm.; shorter axis, 6·5 mm.

Locality.—Eocene clays of the Adelaide bore, South Australia. Collected by Professor Tate.

Genus Paracyathus.

Paracyathus Tasmanicus, *spec. nov.* Pl. ii., figs. 4 *a*, *b*.

The corallum is almost, occasionally quite, straight, and cylindro-conical in shape. with an expanded calice and a very broad flat base, which affords evidence of having been attached to a foreign substance. The calice is elliptical and concave, with a deep central fossa. The relative lengths of the major and minor axes of the ellipse are as 100 to 86.

The costæ are continuous with the septa, and more conspicuous in the superior than in the inferior portion of the corallum. The epitheca is pellicular and thin.

The septa have rounded upper margins, and are thickest at the wall, above which they rise to varying heights, according to cyclical order. They are in six systems, with four cycles. In the example figured the quaternaries are wanting for half of one system; another example shows the systems all complete. The primaries and secondaries are sub-equal in size, and the higher orders become successively both smaller and shorter. All the septa have numerous pointed granules on their sides. There are distinct pali before all the orders except the last, the youngest reaching higher in the calice than the secondaries, and these again than the primaries. Several smaller pali towards the base of the fossa are hardly distinguishable from the papilli of the columella. Both the pali and the columella are well preserved in the figured calice, which belongs to an aged example, but the septa are worn and largely connected by growth rings. In fact, the outer portion of the septal area is much filled up by calcareous matter, to which Lindström has applied the term *stereoplasma*. That the presence of this in such a position in the calice is not of classificatory importance is insisted upon by Duncan,* and its occurrence in the fossil coral here described fully supports his views. Two other examples (one of which is the corallum figured) have the septa perfect, and the calices entirely free from any such growth; but as in both cases the pali were partly broken down in clearing the fossa from sediment, their calices would not serve so well for illustrating the characteristic features of the species. Other poorly preserved specimens are also to hand, several of which are free from stereoplasma, while one or two of them show its presence to some extent.

* Revision of the Families and Genera of the Madreporaria. Journal Linn. Soc., Zoology, vol. XVIII., p. 27, 1884.

Height of corallum figured (young example), 9 mm.; diameters of its calice, 7 and 6 mm. respectively; diameters of calice figured (aged example), longest 10·5 mm., shortest 9 mm. In the corallum of the latter the base is broken off, but the remaining portion is still 11 mm. high.

Locality.—Table Cape, Tasmania (Eocene). Fairly common, but usually worn. Collected by Professor Tate and J. Dennant.

This coral much resembles *P. supracostatus*, mihi. Its more exsert septa and difference in shape entitle it, I think, to specific rank.

Genus Stephanotrochus, *Moseley*, 1881.

Corallum dense and compact in substance, cup-shaped or saucer-shaped, with trace of early attachment, usually with well-developed costæ, bearing a succession of small spines, with widely open capacious fossa. Septa usually extremely exsert, the exsert quinaries, or quaternaries, where these are not present, lying next to the primaries, higher than the tertiaries or equal to them. Columella absent or little prominent.

Four species of corals dredged by the Challenger Expedition, viz., three in the Atlantic and one off the coast of New South Wales, were at first referred by Professor Moseley to the genus *Ceratotrochus*. In his later special Monograph, however, he instituted the above genus for their reception. I have now to draw attention to a fossil coral from the Australian Eocene, which exhibits the essential characteristics of Moseley's genus.

Stephanotrochus Tatei, *spec. nov.* Pl. iii., figs. 1 *a*, *b*, *c*.

The corallum is saucer-shaped, but so shallow as to be almost discoid. Adult examples are compact in substance and free, but younger ones, besides being much thinner, show a small, rounded, and slightly depressed scar of former attachment.

The base is flat and roughly hexagonal in outline. The hexagonal angles are opposite the primary costæ, from each of which a long, stout, but gradually tapering spine projects obliquely downward (approximate angle with base, 145°), so that the coral when placed upon a flat surface rests on the points of six equidistant spiny processes. The basal edges bend gently round to form the wall of the corallum at an angle which varies in different individuals from 45° to about 60°. The costæ, which are continuations of the septa, are prominent on the sides of the corallum, and covered with transverse rows of granules, which give them a serrated appearance. On the base they are either obsolete or just traceable as slightly raised lines, the primaries and secondaries being more persistent than the rest. (It should be noted that the parallel bars shown in the centre of the base figured have no significance, and are absent in similarly worn

specimens). In full grown individuals the base, costæ, and spines are covered by a dense epitheca ; younger ones have the epitheca thin and delicate. The calice is large, open, and scarcely concave ; like the base it is hexagonal in outline, each angle being marked by the strong projection of a primary, and its two adjacent quinary septa. From the latter, the wall curves inwards towards the secondaries, where there is another, but much smaller projection.

The septa are in six systems, with five cycles ; all extend beyond the wall in varying degrees, the primaries the most. In plan they exhibit the same pecularities as were noted by Moseley in the case of the recent *S. nobilis*. The diagram given by him in the Challenger Report of a complete system in the recent form can, in fact, be cited as almost exactly representing the septal scheme of the fossil one. Of the four quaternaries in each system, the two nearest the primaries, besides being slightly thicker than the others, bend towards and join the tertiaries at from half to two-thirds from the wall ; each half system is, in fact, trisected by these two connected septa, so that the tertiaries are, according to the theoretical order of cyclical development, unsymmetrically placed. The quaternaries adjoining the secondaries are straight and free, and approximately equal to the quinaries. Only four of the latter are present in each system instead of eight, viz., between each pair of connected septa, and flanking the primaries ; on either side of the free quaternaries they are absent. In the type calice, the bent quaternary and the quinary between it and the adjoining tertiary are wanting for half of one of the systems. The principal septa increase gradually in thickness according to order as they approach the wall, especially the primaries, which become very stout ; beyond it they taper off rapidly. The higher orders are just slightly thickened at the wall. The primaries and the quinaries next them are very exsert at the margin of the calice, where, also, the latter are joined to the former by a prolongation of the wall. A similar union of the free quaternaries with the secondary septa is also noticeable.

The costal tubercles proceeding from the base are really lateral continuations of the exsert primaries, and mark as it were the framework on which the coral is built ; together they give it a most characteristic appearance. For the most part the superior portions of the septa are broken off in the specimens, but from occasional intact ones still left, it is apparent that in life all of them rose as fan-shaped structures of varying height near the wall. The primaries, secondaries, tertiaries, and bent quaternaries are hollowed out, and deeply notched in their middle portions, and then rise again in one or more smaller elevations,

also fan-shaped, nearer the centre of the fossa. The more central of these elevations are subequal in height, and might, perhaps, in a choked calice be mistaken for pali. It is only necessary to examine a specimen free from adhering sediment to see that they are integral parts of the septa, and not pali. All the septa have granules on their sides, which, especially on the surface of the fans, are arranged in a radiating manner; their upper edges are rendered very irregular from the presence here and there of little knobs and excrescences.

The primary, secondary, and tertiary septa extend to the centre of the calice, but before reaching it, they are twisted, often fused together, and all connected by much tortuous calcareous matter, having raised papilli on its surface. The columella so formed is therefore parietal only, but it occupies a large space in the calice.

The type specimen, which is an exceptionally well-preserved one, measures 18 mm. across the primary septa, and 14·5 mm. where narrowest; diameter of base midway between the hexagonal angles, 13 mm.; thickness through the centre of coral, 3·5 mm. A spine with point broken off is 5 mm. long.

The dimensions of a larger but worn specimen are:—Diameter of calice, 24 and 21 mm.; and of base, 15 mm.; length of spine, also broken, 8 mm.

Locality.—Tolerably abundant in the Eocene cliffs at Spring Creek, 13 miles south of Geelong, Victoria.

This elegant coral is quite unlike any other in the Australian tertiaries, but is closely allied to one from New Zealand, which was doubtfully identified by Ten.-Woods with *Trochocyathus* (?) *Mantelli*, Milne-Edwards. The latter has also basal tubercules, while the quinaries which respectively flank the stout primary and secondary septa are fused to them at the wall. A drawing of its base only was published by Mantell in 1850, and the above tentative name was added by Milne-Edwards. Woods' species is probably the same, but in the fragment described and figured by him pali were supposed to be present. An example, however, from the Waitaki River, in the Museum of the University of Adelaide, which has been placed in my hands, shows no pali, but only raised structures on the upper central margin of the septa just as in *S. Tatei*, and I therefore conclude that it should also be referred to Moseley's genus *Stephanotrochus*.

FAMILY EUPSAMMIDÆ.

Before describing the next species, a few preliminary remarks upon the characteristics of the genus *Trematotrochus*, in which I place it, are necessary.

In the original diagnosis of this genus by Ten.-Woods,* pali were supposed to be present, but the structures observed are merely the lobed or thickened ends of some of the principal septa. By Duncan they are called paliform lobes or dentations around the axial space. An amendment of the genus proposed by the latter author† was based upon Woods' drawings and description of *T. fenestratus*, the only species then known. To him is due the recognition of a third cycle of rudimentary septa answering to the third cycle of well developed costæ, but in some other respects his description is incorrect and misleading. The perforated wall, which is questioned by him, is, nevertheless, undoubted, and forms an essential characteristic of the genus. In regard to this I entirely concur with Woods, who remarks—"The pores go right through the wall; in fact, as the pores are very large, the portion of the wall which separates them becomes little more than a flat transverse bar." I may add as confirmatory of his conclusion, that a longitudinal section of the coral, prepared so as to leave a portion of the wall intact, admits light freely through the pores. Duncan follows Woods in stating that there is no columella. As further detail, he adds—"The septa, which are large and equal, extend close to the axial space, and form a tube-like space." The equality of the septa is evident enough from Woods drawings, his assertion to the contrary in the accompanying description being a mistake. The tube-like space is, however, not vacant, as might perhaps be inferred, but filled with hard nodular tissue, which, uniting with the septal ends, forms a columella. This is visible also in transverse sections of the corallum, cut either near the upper surface or close to the base. As to which of the two principal orders of septa should be considered the primary is not easily decided. I am inclined to reverse the order of development assigned to them by both the authorities quoted. In the new species described below, the lobed septa are, I judge, those of the second order.

Notwithstanding its perforated wall, the genus was placed by its author among the Turbinolidæ on account of its supposed analogies with certain genera in that family. The second species referred to shows, however, in addition to a distinctly perforated wall, a regular fusing together of certain septa in each system at some distance from the margin, as in the genera of the Eupsammidæ. I can, in fact, see no reason for the retention of the genus in the Aporosa Section of the Madreporaria, and place it instead under the Perforata. The regular perforations in the

* Proc. Royal Soc., New South Wales, vol. XII., 1878, p. 59, fig. 2.

† Revision of Madreporaria. Jour. Linn. Soc., Zoology, vol. XVIII., pp. 20, 21.

wall of *Trematotrochus* are well-represented by the radial pores on the base of *Stephanophyllia.*

In the following revised diagnosis of the genus I have noted what appear to be its essential attributes.

GENUS TREMATOTROCHUS, *T. Woods* (*emend*).

Corallum simple, conical, free. Calice circular or elliptical with distinct margin. Costæ prominent. Septa in six systems, solid, and continuous with costæ. The inner ends of some are lobed and united to hard nodular tissue, which occupies the axial space and constitutes the columella. The highest cycle of septa is small or even rudimentary and corresponds to well developed costæ. Wall incomplete in the intercostal spaces, which are regularly fenestrated. Neithere ndotheca nor synapticulæ present. No epitheca.

Trematotrochus Clarkii *spec. nov.* Pl. iii., figs. 2 *a*, *b*.

The corallum is small and roundly conical in shape. It is slightly contracted at the calice, which is circular, with a subplane surface.

The septa are in six systems with four cycles. The primaries are free and of nearly the same thickness throughout. I select these as primary because they are continued on the wall by costæ which evidently constitute the original framework of the coral. Usually there is but one tertiary developed in each system and this joins the secondary at from one-third to a half from the wall. A single one of my specimens shows two tertiaries in four of the systems, the additional one present also joining the neighbouring secondary. Before uniting, the tertiaries and secondaries equal the primaries in thickness, but their fused portions are much stouter. In most examples, as in the one figured, there are thus 18 equal septa at the margin of the calice, but in the exceptional one mentioned there are 22. In all cases, however, the interspaces are approximately equal. Each of these is at the circumference medially divided by a cycle of rudimentary septa just as in *T. fenestratus.* These are very small, and, in fact, only occasionally visible in the calice as extremely short needle-like spikes. The septa of the three first orders are solid, exsert, and minutely granular on their sides ; the secondaries are much lobed and indented in their thickened portions.

The columella is formed by hard nodular tissue, which occupies a small but well marked area between the opposite ends of the principal septa at the centre of the calice. The secondaries, and the primaries also in well preserved examples, unite with it, the thickened and lobed ends of the former rising slightly above its upper surface. It is continuous downward nearly, if not quite,

to the base of the corallum. In a young example lately collected, about two-thirds of the upper portion of the fossil has been worn away by fossilization, and at the bottom there is still a prominent columella.

The costæ are continuous with the septa, and thus vary in number exactly as these do. Including the quaternaries the total number of costæ is normally 36, but in the example mentioned with four extra tertiary septa, 44 separate costæ were counted at the upper margin of the wall, there being a quaternary in every interspace of the other cycles. The primaries are distinct and free right to the base; the tertiaries unite with the secondaries at varying heights on the wall from about two-thirds below the summit to quite close to the base. These three orders of costæ are stout and subequal in size, the primaries becoming, perhaps, slightly the stouter towards the base. The costæ of the fourth order are always well developed, and about half as thick as the others; they meet either the secondaries or the tertiaries at heights on the wall which vary considerably in the several systems. The intercostal spaces, which towards the upper margin of the corallum equal the costæ, are crossed by thin transverse bars, between which there is a series of regular pores similar to those in *T. fenestratus*; they are, of course, most conspicuous in the upper part of the corallum, where the intercostal spaces are widest. In the young example referred to above with worn and excavated calice, the pores are visible on the inner as well as the outer surface of the wall. Towards the margin of the calice also in most examples the complete perforation of the wall is plainly seen.

Altitude, 5 mm.; greatest diameter of corallum, 4 mm.; diameter of calice, 3 mm.

Locality.—Tolerably abundant in Miocene beds at Mississipi Creek, Gippsland Lakes area. Twelve examples. The species name is in compliment to Mr. Donald Clark, from whom I received my first specimen.

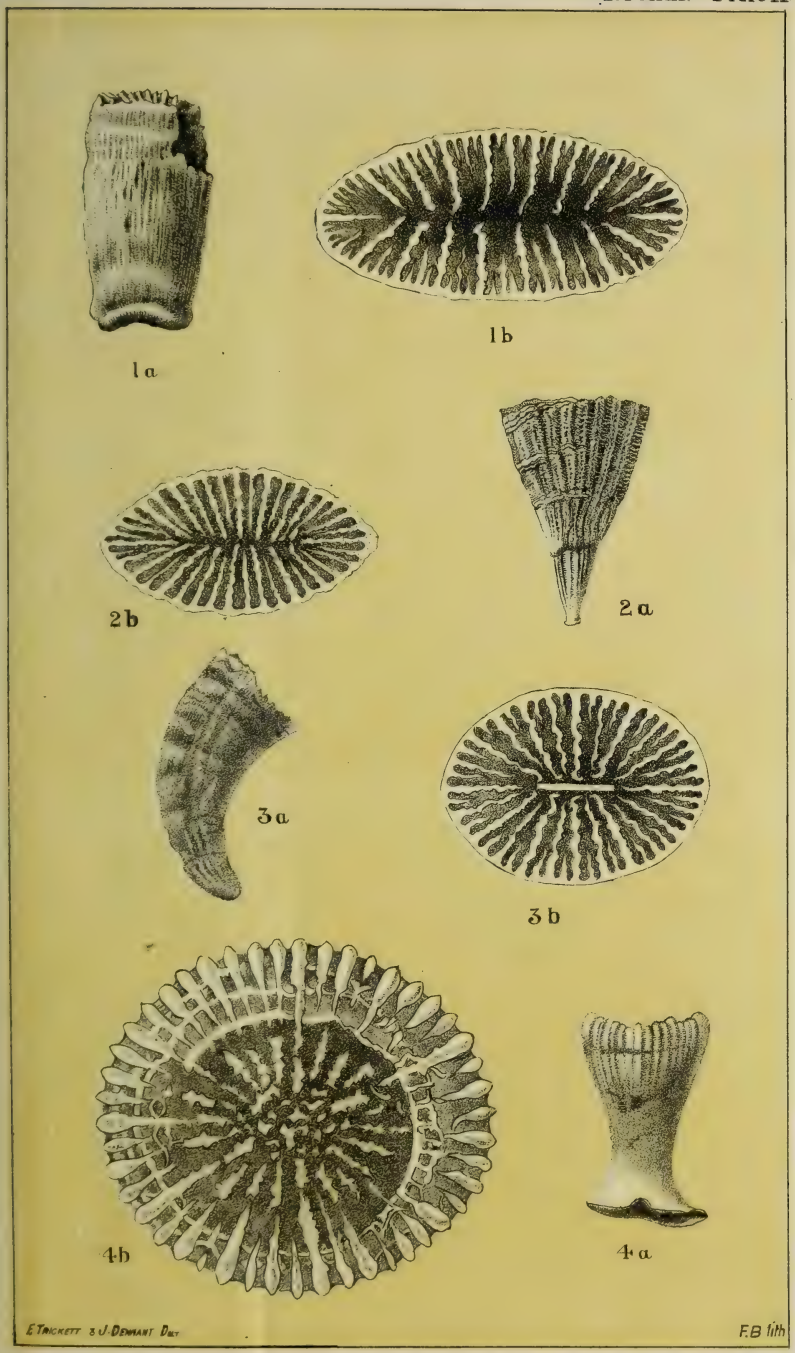
EXPLANATION OF PLATES.

Plate II.

Fig.
1. *Flabellum Gippslandicum*—*a*, corallum, nat. size; *b*, calice, 3 diam.
2. *Flabellum fastigatum*—*a*, corallum, nat. size; *b*, calice, 2 diam.
3. *Placotrochus corniculatus*—*a*, corallum, 1·5 diam.; *b*, calice, 4 diam.
4. *Paracyathus Tasmanicus*—*a*, corallum, 2·5 diam.; *b*, calice, 5 diam.

Plate III.

1. *Stephanotrochus Tatei*—*a*, corallum, 2 diam.; *b*, base, 2 diam.; *c*, calice, 3 diam.
2. *Trematotrochus Clarkii*—*a*, corallum, 6 diam.; *b*, calice, 10 diam.
3. *Flabellum curtum*—*a*, corallum, 2 diam.; *b*, calice, 3 diam., showing three systems.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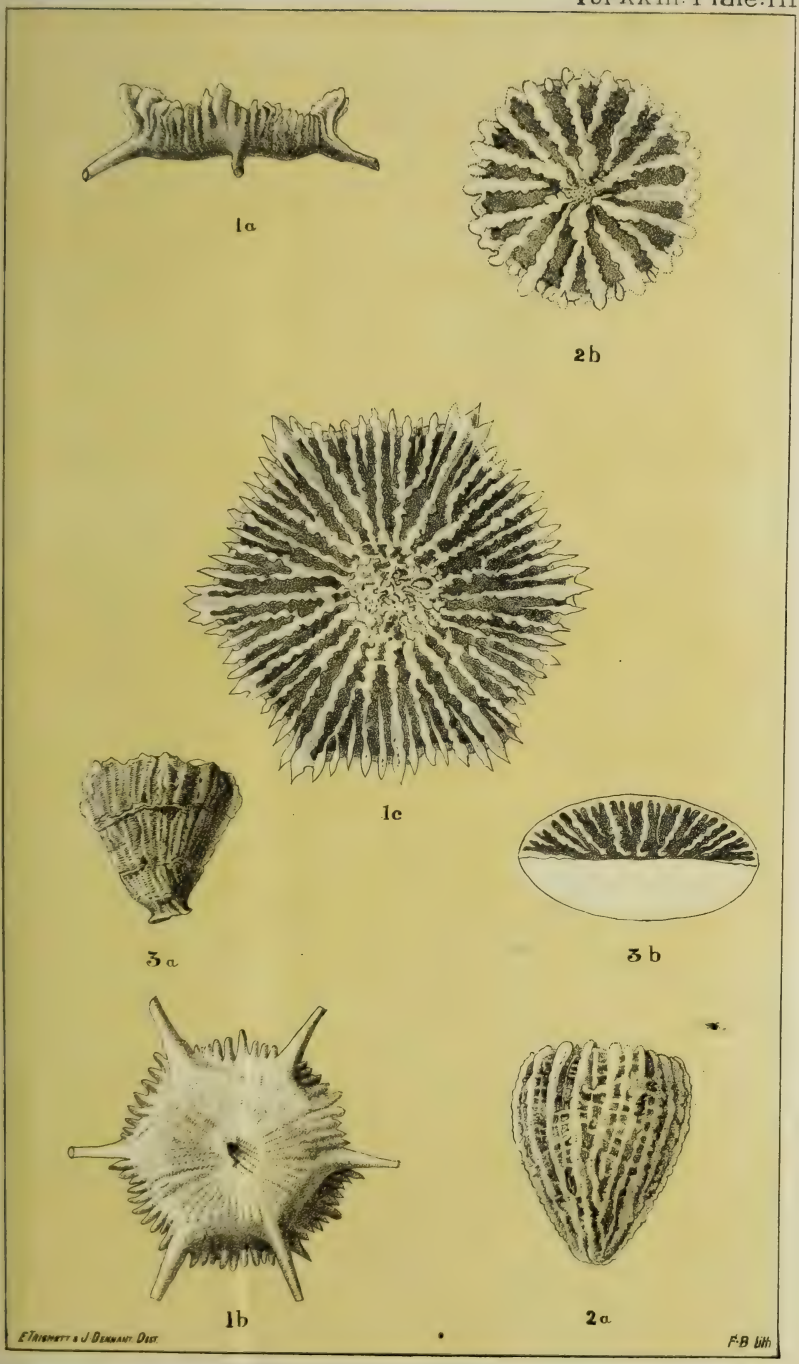
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Preliminary Notes on Phascolonus gigas, Owen [Phascolomys (Phascolonus) gigas, Owen], and its identity with Sceparnodon ramsayi, Owen.

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[Read July 4. 1899.]

INTRODUCTION.

In 1872 Sir Richard Owen described, under the designation of *Phascolomys gigas*,* certain fragments of mandibles of a large extinct wombat-like animal. At the same time he suggested for it the name *Phascolonus* if, thereafter, it should be found necessary to confer on it generic or subgeneric distinction.†

In 1883 the same writer ascribed certain peculiar adze-like teeth to *Sceparnodon ramsayi*,‡ the generic name having been suggested by Dr. Ramsay, then Curator of the Australian Museum, Sydney, who had transmitted casts of the teeth in question.

In the following notes we desire to show—

(1) That the teeth, in question, ascribed to *Sceparnodon ramsayi* are the upper incisors of *Phascolonus (Phascolomys) gigas;* and

(2) That Owen's anticipation, that a more extended examination of the remains of the animal to which his fossils belonged might prove to be generically distinct from Phascolomys, is fulfilled.

We shall therefore adopt definitely the name Phascolonus which Owen's prevision led him to suggest and which thus caused him to bracket it with that of Phascolomys in the index to his volumes on the Extinct Mammals of Australia. The probable correctness of this anticipation has already been to some extent recognised for, in the British Museum Catalogue of Fossil Mam-

* Phil. Trans. R. Soc. of London, vol. CLXII. (1872), pp. 248—258. Extinct Mamm. of Australia, pp. 346—355.

† *Vide* footnote to above papers, pp. 251 and 348 respectively.

‡ Phil. Trans., vol. CLXXV. (1884), pp. 245—248.

malia, Part V. (Lydekker, 1887), p. 157, Sceparnodon appears as a synonym of the definitely established genus Phascolonus; so also a similar view has been adopted in Mammals Living and Extinct (Flower and Lydekker) p. 146.

Elsewhere* Lydekker has stated the reasons on which he bases his conclusions as to the generic identity of the two forms.

On the other hand their identity has been disputed by DeVis,† who, in the latter of the two communications referred to, describes and figures, as the real incisor of *Phascolonus*, a tooth of a form very different to that ascribed by Owen to *Sceparnodon;* but whatever this tooth may be, it is certainly not that of Owen's *Phascolonus.*

In the light of DeVis' statements, Lydekker expresses himself more doubtfully on the subject in his later work, "Marsupials and Monotremes," 1894, p. 266.

The very complete evidence afforded by the Callabonna remains will, now however, finally decide the point in favour of identity.‡

As regards the first proposition the assertion rests on the clear evidence afforded by the Callabonna discovery.§ Amongst these remains, and associated with others of the same animal, were two mandibles, nearly complete except as to the upper two-thirds of the ascending ramus, which corresponded exactly to those of Owen's *Phascolomys (Phascolonus) gigas.* One of these mandibles belongs to other fragments which, together, make up a large portion of the cranium. Fortunately the maxillary portion is included and in this are implanted a nearly perfect pair of the adze-like teeth in question, these having precisely the same characters as, though they are rather larger than, those ascribed to Sceparnodon by Owen. Of this pair the left allows its length to be taken from the chisel edge for a length of 160 mm. along its convexity to its broken implanted end. The right tooth has lost one inch of its anterior extremity but has preserved about that amount more of the implanted end than its fellow. Thus we may be sure that the whole length of the perfect tooth must have been at least 180 mm. but it was probably not much more, as the considerable amount of pulp cavity exposed at the broken implanted end of the right tooth indicates that its posterior limits had been nearly reached. This limit corresponds to a vertical drawn through the upper premolar. The width of these teeth

* Proc. R. Soc. vol. XLIX., 1891, p. 60.

† Proc. Linn. Soc. of N.S.W., 1891, vol. VI. (2), pt. 2, p. 258, and vol. VIII., 1893 (2), pt. 1, p. 11.

‡ For a review of various opinions that have been expressed on this question *vide* an article by Dun in the Records Geol. Survey of New South Wales, vol. III., 1892, p. 25.

§ Nature, vol. L., 1894, pp. 184 and 206.

is 38 mm. both at their anterior and posterior ends. An apparently nearly perfect isolated tooth from the same locality has the very similar dimensions of 182 mm. and 39 mm. for its length and breadth, respectively, and in this it can be seen that the width is preserved, with almost absolute uniformity, throughout its whole extent. The thickness in the mid-longitudinal line of the tooth, just posterior to the bevel of the cutting edge, is 8 mm. which, at the somewhat thickened lateral borders, is increased to 10 mm. These measurements, also, apply along the whole length of the tooth.

Thus it will be seen that the Callabonna teeth are somewhat larger than those that came under the notice of Owen. No other incisors exist in the upper jaw.

The restoration of the skull has not been completed, but the large fragment which contains the pair of upper incisors contains also on each side a complete molar series of phascolomydian type. Of this the antero-posterior length, measured along the grinding surfaces, is 114 mm. In an old *Phascolomys mitchelli* and a young adult *P. latifrons* the corresponding lengths are 53 mm. and 49 mm. respectively.

In *Phascolomys mitchelli* the section of the upper premolar is sub-triangular and its inner side is indented by a distinct longitudinal groove which imperfectly defines a small anterior lobe from a larger posterior; in *P. latifrons* scarcely a trace of such a groove exists and the section approximates to a quadrate figure.

In *Phascolonus gigas* the bilobate character of this tooth is more distinctly evident both by the sharper definition of the groove and by the greater relative size of the anterior lobe, the transverse width of which, however, still falls considerably short of that of the posterior. On the outer side of the tooth there is a barely evident longitudinal depression which can barely be called a groove. The antero-posterior length of the premolar grinding surface is to the succeeding molar as 19 to 24.

Of the true molars *M.* 1 and *M.* 2 are the largest of the series and approximately equal in size; *M.* 3 is distinctly smaller both in length and breadth and in all three the lobes are approximately equal. The posterior, or fourth, molar is unequally bilobed and is still more reduced in size—it is in fact smaller than the premolar. The reduction chiefly affects the posterior lobe but it is also shared by the anterior. The inferiority of size of the last molar is, also, a character in both *Phascolomys mitchelli* and *P. latifrons*, but in the latter the two lobes are more nearly of equal size than in the former, where the anterior division has remained relatively larger.

Of the two specimens of lower jaw which are included amongst the remains one comprises the united horizontal rami with the

dental series complete, but nearly the whole of the ascending rami are missing; the other is a similar, though somewhat less complete, fragment having lost, in addition to the ascending rami, that part of the symphysis in advance of the premolars, in which the incisors were implanted.

Of these fragments it is sufficient, for the object of this communication, to state that they correspond *pro tanto* to Owen's descriptions and they thus indicate a rather closer resemblance, on the whole, to the latifront than tothe platyrrhine species of living wombat.

We must postpone our remarks upon the remainder of the skull until it shall have been more completely restored.

Passing now to a brief notice of the bones of the appendicular skeleton, in which we shall dwell rather upon departures from than upon agreements with the phascolomydian type, we may say that they are without exception of an extraordinarily massive character, as will be more particularly indicated by the length and breadth dimensions to be subsequently given.

SCAPULA.

Length* (from tip of coracoid process to base at junction of spine, 295 mm.; the breadth owing to mutilation cannot be given. Length of glenoid cavity, 85 mm.; the breadth cannot be stated.

Phascolomys latifrons:—Length of Scapula, 116 mm.; of glenoid cavity, 25 mm.

In the one specimen of this bone which we possess there have been preserved the whole length of that portion of the body from which springs the spine, the greater part of the spine itself (exclusive of the acromion), the neck, glenoid cavity (somewhat damaged) and coracoid process.

Such parts of this bone as permit of comparison reveal phascolomydian features, the chief noticeable difference being that, in the fossil, the coracoid process, on to the base of which the glenoid surface extends as it does in the wombat, is not as in the latter deflected in the direction of the subscapular fossa.

HUMERUS.

Maximum length, 238 mm.; maximum breadth (between epicondyles), 126 mm.

Wombat:—Length, 105 mm.; breadth, 48 mm.

* In each case the length given is the distance between the transverse parallels of the two extreme points. The breadth is that of the widest part of the bone, the position of which will be indicated. For comparison the corresponding measurements in a young but fully grown *Phascolomys latifrons* will be also stated.

This bone is represented by one almost perfect specimen; another lacking only the ect-epicondyle and the corresponding part of the distal articular surface, and a third comprising the ent-epicondylar moiety. While preserving many typical phascolomydian characters, it nevertheless does not possess an ent-epicondylar foramen; a very shallow emargination of the internal border, however, exists at the level of the lower end of the deltoid ridge. The ent-epicondyle itself is relatively less internally produced than in the wombat, so that there is less asymmetry in the disposition of the two sides of the distal extremity.

The insertional line of the pectoralis, which in the wombat forms a low, almost linear, ridge, is, in Phascolonus, a prominent angular crest the presence of which confers a distinct angularity upon the section of the bone in this region; the lower end of this crest, moreover, where it meets the deltoid ridge, forms a somewhat swollen tuberosity in place of, as in the wombat, a simple angle of meeting.

Though we can only refer to Owen's plate of the humerus of Nototherium,* the prominence of the pectoral ridge in Phascolonus suggests an approximation to this conspicuous feature in the former fossil. The angular ridge, which in the wombat extends obliquely from the angle of junction of the pectoral and deltoid ridges to become continuous with the proximal end of the ent-epicondylar bridge, is, in Phascolonus, represented by its upper part only, which soon subsides upon the general thenal surface of the shaft, and its direction, moreover, in the latter case, is vertical or in a line with the middle of the gap between the radial and ulnar moities of the inferior articular surface.

RADIUS.

[Represented by one complete bone and the proximal half of another.]

Length, 174 mm.; breadth (at widest part of distal end), 44 mm.

Wombat :—Length, 100 mm.; breadth, 21 mm.

The contour of the head more nearly approaches a circular figure in Phascolonus than in Phascolomys, which feature is partly due to a somewhat less degree of flattening of its anconal aspect. In the wombat the proximal border of that part of the head which is applied to the lesser sigmoid cavity reaches to a slightly higher level than does that of the opposite side; in Phascolonus the conditions are reversed. The interosseous ridge, the top limit of which in the fossil reaches to the level of the lower edge of the bicipital tuberosity, is very prominent and rough so that the shaft of the bone is at its broadest at a point

* Extinct Mamm. of Australia, Pl. cxxvii., Text p. 517.

about half an inch below the tuberosity. From this point the width gradually declines until the shaft begins to broaden again into the distal expansion. In the wombat, on the other hand, the shaft is at its narrowest just below the tuberosity, thence gradually widening towards the lower end. In the fossil the bicipital tuberosity is proportionately smaller but more prominent and relatively more distant from the head than in the wombat.

ULNA.

[One specimen which lacks the lesser sigmoid cavity and (excepting its upper lip) that part of the greater cavity which is applied to the radial division of the distal humeral articulation. The styloid process, also, is not quite complete. but this is perfect in a second fragment comprising the lower half of the bone.]

Length, 250 mm.; breadth (across thenal surface at level of inner division of humeral articular surface), 95 mm.

Wombat:—Length, 135 mm.; breadth, 29 mm.

To an immense olecranon process, which is proportionately larger than that of Phascolomys, is added, in Phascolonus, a marked production thenad of the proximo-thenal angle, the effect being to produce, in the region lying between the tip of the olecranon and the thenal side of the sigmoid cavity, a much more marked depression than exists in the corresponding part of the ulna of the wombat. The anconal surface both of the olecranon and shaft is traversed for nearly their whole length by a distinct, broad but shallow groove which, in the wombat, is scarcely apparent. The styloid process in the fossil is very distinctly semi-oviform with a marked inflection thenad; in the wombat it is nearly circular in contour and obtusely conical in form.

CARPUS.

[Of the Carpus the cuneiform (one specimen), pisiform (two specimens), and unciform (two complete and three fragmentary specimens), only, are represented.]

The first named combines phascolomydian and diprotodontoid features;* the pisiform almost exactly repeats on an enlarged scale the characters of this bone in the wombat, and is thus unlike that of Diprotodon; the unciform, which possesses a large unciform process, is also chiefly phascolomydian in its characters.

The carpal bones reveal an even greater proportionate size, when compared to those of the wombat, than do the long bones.

* A description of the manus and pes of *Diprotodon australis*, forming part I. of vol. I. of the Memoirs of the Royal Society of South Australia, is now in the press.

Thus, in a pisiform of Phascolonus, the length and breadth are 52 mm. and 33 mm. respectively as against 16 mm. and 10 mm. in the latifront species.

FEMUR.

[One nearly complete bone and a fragment comprising the lower end.]

Length, 338 mm.; breadth (transverse width of upper end between head and great trochanter), 152 mm.

Wombat:—Length, 133 mm.; breadth, 43 mm.

Diprotodontoid features are conspicuous in this bone. They are to be seen in the width of the upper extremity; the egg- or pear-shaped outline of the head (when viewed proximally) owing to the production of its articular surface on to the neck; the elevation of the head to a considerably higher level than the summit of great trochanter, though not to the degree that obtains in Macropus; want of elevation of the lesser trochanter; the marked fore-and-aft flattening of the shaft and upper end, particularly of the great trochanter; absence of the popliteal depression, the plane of the hinder surface of the shaft being continued into the intercondyloid groove, and the anterior production of the fore part of the inner condyle.

In the wombat the contour of the head, from the proximal point of view, is much more nearly circular, though there is here, too, some slight extension of its articular surface on to the neck; the height of the great trochanter barely exceeds that of the head and it is less compressed; the small trochanter forms a prominent and compressed ridge, and the shaft is nearly cylindrical at its middle; the forepart of the inner condyle, though more prominent than that of the outer, is not produced, as in Phascolonus, into a sub-conical prominence.

One feature common to both Phascolonus and Phascolomys is a shallow but distinct transverse groove which crosses the outer condyle at its junction with the rotular surface. In Diprotodon it is the inner condyle which is traversed by a similar groove.

The third trochanter in Phascolonus seems to be represented by a rough oval tract situated on the post-axial side of the a little proximad of its middle.

TIBIA.

[Two almost perfect specimens of opposite sides and slightly varying size.]

Length, 207 mm. and 198 mm. respectively; breadth (of proximal end), 104 mm. and 101 mm.

Wombat:—Length, 103 mm.; breadth, 30 mm.

The tibia exhibits, among other phascolomydian features, a very marked lateral compression but, in place of the deflection, fibulad,

of the middle portion of the sharp anterior edge, there is, in Phascolonus, a conspicuous twist in the continuity of the bone of such a kind as would arise from a similar inflection of both the anterior border of the lower end and of the posterior border of the upper. From the combined effect of the twist, as affecting the upper end, and of the considerable actual production, postero-internally, of the latter it arises that the proximal surface is not only of great superficial extent but also asymmetrically disposed by reason of its extension in conformity with that of the head. The condylar depressions of this surface show a similar asymmetry in size as well as in position, and both are thrown far back upon it, so that a large area of non-articular surface lies in front of them, the latter feature being also present in the wombat. The inner condylar depression, considerably the larger of the two, is ovoid in shape and deeply concave, the depth of the concavity being contributed to by the encroachment of its articular surface on the inner and higher of the two antero-posteriorly disposed ridges which, together, form the spine of the tibia. The surface for the outer condyle is sub-polygonal in shape and generally flat except for that portion of it which rises on to the outer of the two spinous ridges. In the wombat there is less inequality of size between the condylar surfaces and the outer is distinctly convex though the inner is concave.

In Phascolomys the superior tibio-fibular articulation, which is nearly flat antero-posteriorly, to a large extent underlies the the outer condylar surface, the two articular tracts making an acute angle with one another. In the fossil this angle is less acute and a distinct degree of fore-and-aft concavity of the fibular articular surface is expressed.

The internal malleolus of the lower end of the fossil tibia is very broad antero-posteriorly; it is not, as in the wombat, produced, inferiorly, into a compressed conical process; and the articular surface for the astragalus, instead of extending, as in the latter, on to the whole of the external face of the malleolus, encroaches upon it but to a very limited extent. It is with this latter part that is articulated the inner surface of a low prominence that will be afterwards described as rising from the inner border of the tibial surface of the astragalus.

A depression on the articular surface of the distal end of the tibia, just external to the malleolus, receives the summit of the projection itself.

A distinct triangular facet for the os pyramidalis exists which makes an obtuse angle both with the astragalar surface and with the plane of the hinder region of the extreme lower part of the external surface of the shaft.

FIBULA.

The mutilation of both ends of the only bone obtained of this kind precludes satisfactory measurement or description.

ASTRAGALUS.

[One complete specimen.]

The Astragalus presents a combination of phascolomydian and diprotodontoid features with a preponderance of the latter.

It shares the generally depressed characters of the head of this bone in the wombat, but whereas, in the latter, the anterior articular convexity for the navicular is coincident with the whole anterior transverse width of the bone, there is, in Phascolonus as in Diprotodon, a non-articular tract to the outside of that part which represents the head. Though less conspicuously than in Diprotodon the internal border of the superior surface is, in the same kind of way, elevated into a low pyramidal or conical projection but, unlike the condition which obtains in Diprotodon, the inner side of this is partly articular, being in opposition with the limited portion of the astragalar surface of the tibia that has been mentioned as extending on to the outer surface of the internal malleolus. This small tract on the inner side of the projection is the only representative of the extensive surface that, in the wombat, articulates extensively with the internal malleolus.

In both Diprotodon and *Phascolomys latifrons* the articular surface of the head of the astragalus and of its tibial surface are discontinuous by the intervention of a non-articular tract but in Phascolonus the two are continuous by an extension of the latter which meets the former.

A feature of the astragalus of Phascolonus, not found in Diprotodon in which the tibial surface is remarkably flat, is a certain amount of elevation of the border of its antero-external region; thus the slope, inwards, from this raised edge and the opposing slope, outwards, from the previously described pyramidal elevation of the inner border produce a marked concavity between these two elevations.

The continuous articular tract on the external aspect for the fibula and pyramidalis is, as in the wombat, also directly continuous, though at a less acute angle, with the calcaneal surface of the bone; in Diprotodon the two are separated by an intervening non-articular strip.

On the under side the features of the astragalus present a considerable resemblance to those of the corresponding surface in Diprotodon, the principal difference being in respect of the relatively large non-articular tract which, in Phascolonus, is left n the postero-internal region.

METATARSALS (METACARPALS?).

The remains of Phascolonus include four bones of a form very similar, on a proportionately reduced scale, to that of the fifth metacarpal and metatarsal of Diprotodon. In all of these the characteristic production of the outer border is repeated in much the same way. One of them, slightly longer than the others, also has its postero-external angle produced backwards as well as outwards as a somewhat laterally compressed conical process, the tip of which reaches a point considerably to the rear of the proximal articular surface. In two others, probably a pair, the production of the proximal part of the outer border is outwards rather than backwards, so that the tip of the production does not reach to the rear of the proximal articular surface of the bone. In both of these latter, moreover, the outer border is emarginate —a feature which accentuates the prominence of the production; whereas in the one previously mentioned the outer margin is even. We should have been confident in attributing the first mentioned single bone to the metatarsus and the pair to the metacarpus but that, in a fourth specimen, the production of the postero-external angle is of an intermediate character, being both backwardly and outwardly directed. The outer margin of this is also emarginate, though to a less extent than in the supposed pair. Thus it is quite possible that they may be all of one denomination. Assuming, however, the correctness of our supposition that the first mentioned single bone is, in all probability, a metatarsal, it may be said of it that in the general production, to a greater or less extent, of the whole outer border it bears a close resemblance to the corresponding bone of Diprotodon, while the special extension, backwards, of the postero-external angle forms a feature common to this bone in both Diprotodon, Phascolomys, and Phalangista.

There are a few other bones and fragments of bones which belong either to the metacarpus or metatarsus, but as we are not quite sure of their exact position we will not for the present take them into consideration except to remark that, in their general characters, they resemble certain of the bones of these segments in Diprotodon rather than in the wombat.

PHALANGES.

Two consecutive phalanges—of the proximal and middle series —which, there is reason to believe, belong either to the supposed fifth metatarsal (though they might also belong to one of the bones considered as the corresponding metacarpal) show a great diminution of size when compared to the precedent segment. The proximal is a small compressed element with a conspicuous production, postero-externally, of its corresponding angle and, to a

greater or less extent, of its outer border. The middle phalanx is a still smaller compressed sub-quadrate bone. In the above features and in the depression of their articular surfaces both show a resemblance, on a small scale, to the proximal and middle segments of the fifth digit of the pes of Diprotodon.

The ungual phalanges, of which four are represented, repeat, on a scale of about twice the size, the features of these elements in the wombat being considerably depressed and only slightly curved.

ATLAS.

[One specimen in which the tranverse processes have suffered considerable abrasion.]

Transverse width, measured anterior to, but exclusive of, the transverse processes, 110 mm.

Wombat, similarly measured 43 mm.

In the atlas of Phascolonus the continuity of the anterior bony arch is interrupted by a vacuity as in Diprotodon, in the wombats and in some other marsupials, and the gap is of greater relative width (45 mm.) than in the forms specifically mentioned. In the atlas of a latifront wombat the interspace measures 10 mm. and in that of a Diprotodon only 26 mm.

The neural arch is distinctly more flattened than in the wombat and the transverse process is grooved for the vertebral artery, but to a slight extent only. The neurapophysis is perforated, for the passage of the first cervical nerve, in much the same way as in the wombat.

AXIS.

[A fragment comprising the body and odontoid process—the greater part of the neural arch being absent.]

Such parts as are preserved, present, generally, the features found in the axis of Phascolomys but the odontoid process, which in P. latifrons is somewhat antero-posteriorly compressed, would appear to have been more conical in form though it is possible that the abrasion to which it has to some degree been subjected may have modified its original shape.

Besides the bones that have been specifically mentioned above there exists also amongst the Callabonna remains about a dozen ribs, a few vertebral centra and two or three fragments of the pelvis. For the present we defer consideration of these.

REMARKS.

The preceding notes, which we hope may shortly be followed by a more complete, as well as adequately illustrated, description, will at least indicate the more conspicuous features of a large part of the skeleton of *Phascolonus gigas*. It has

been directly noticed, or implied, that the molar teeth and the form of the mandible, notwithstanding certain differences, which may even be of generic value, are essentially phascolomydian in type, and there exist, amongst the cranial and dental characteristics, points of resemblance to both the latifront and the platyrrhine living species which, with a more extended description, might have been more numerously and saliently brought out.

The type of the lower incisors is also essentially phascolomydian, though, as Owen* has pointed out, they differ in several respects from those of the living species of wombats.

The bones of the appendicular skeleton that have been examined are predominantly of the same type, and this is particularly so in the case of the scapula, humerus, unciform, pisiform and ungual phalanges; to a less, but to a considerable, extent in the ulna and tibia. Nevertheless, some of them, notably the femur, astragalus and fifth metatarsal (even if the last-named should belong to the metacarpus), present features which strikingly resemble those of the homologous bones of Diprotodon.

The remarkable adze-like upper incisors are peculiar to Phascolonus though, in several respects, they more nearly resemble these teeth in Diprotodon than in Phascolomys.

In the absence of actual objective comparison we cannot lay much stress upon the presumed nototherian feature mentioned in connection with the humerus, though it is significant, in this connection, that Owen has indicated a feature common to Nototherium and Diprotodon in the disposition of the ascending ramus.† Quite irrespective of this, however, the more generalised characters of the skeleton of Phascolonus, when compared with that of the existing wombats, seem to be abundantly expressed in many directions, and the degree of generalisation, moreover, extends beyond the range of its nearest phascolomydian allies. There can at least be no doubt but that the differences which exist between this fossil and the living species of wombats are such as to amply justify its generic separation from Phascolomys.

It is perhaps unfortunate that priority of establishment necessitates the retention of the name Phascolonus for, as a matter of fact, its height, calculated on the basis of the length of the leg segments in comparison with those of a latifront wombat, could not have much exceeded two feet, thus falling far short of that of the ass to which Owen supposed its size to approximate. By the

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* Phil. Trans., vol. CLXII. (1872), p. 253. Ext. Mamm. of Aust., p. 351 (Text).

† Phil. Trans. vol. CLXII. (1872), p. 250. Ext. Mamm. of Australia, p. 348.

criterion of size the term is, however, less inappropriate than that of Phascolomys is to the wombats.

Having regard to its moderate size, to the massive characters of the bones of the limbs and to the powers revealed by the prominence of processes for muscular attachment, one might be inclined to attribute to this animal the same fossorial habits as the existing wombats. But, as Owen has pointed out, this inference does not necessarily follow and, indeed, the few elements of the digits that we possess do not reveal a strength co-relative with that of the rest of the skeleton, except perhaps in so far as the claw-bearing phalanges are concerned, and even these do not exhibit so great a proportionate size as many of the other bones. In their small size, depression, and consequent limitation of their articular surfaces, the phalanges are more comparable to the feebly jointed segments of the digits of both the manus and pes of Diprotodon. So that these parts, at least, of the limbs of Phascolonus would seem to be incompatible with the same vigorous burrowing powers as are possessed by the living representatives of the Phascolomyidæ.

Descriptions of Australian Curculionidæ, with Notes on Previously Described Species.

By Arthur M. Lea.

[Read September 5, 1899.]

Part I.

The Australian Curculionidæ are comparatively little known. Including the Scolytidæ, Brenthidæ, and Anthribidæ, scarcely 1,900 species have been recorded; and I believe that fully 4,000 species of the allied families occur in Australia and Tasmania.* The Brenthidæ, as might be expected, are better known than the other families, but even now contains a number of undescribed forms. The Scolytidæ, despite their great economic importance, are little known, scarcely one dozen species having been described; and the Anthribidæ are in an almost similar state. Of the true Curculionidæ, the subfamilies *Hyperides*, *Magdalinides*, *Tychiides*, *Cionides*, *Baridiides*, and several others are almost untouched. Some of the larger subfamilies are in great confusion. No attempt has ever been made to systematically arrange the genera; in consequence, many of them remain in the positions to which they were originally consigned, and which are often erroneous. It seems to me, for instance, that to strictly attach subfamily importance to the presence or absence of ocular lobes, and as to whether the scrobes are directed straight towards or slightly below the eyes, are mistakes. In this and succeeding papers, however, I do not propose to attempt a classification of the family, but simply to describe such new forms as I can find time to work up, and to give new or exact localities for previously described species, together with remarks on variation, synonymy, &c.

The present paper is confined to members of the *Erirhinides* (a subfamily, of which large numbers of genera and species have already been described by the Rev. Thomas Blackburn, in the Transactions of this Society for 1893 and 1894). Altogether 83 species are described, and are referred to the following genera:—*Desiantha* (6), *Anorthorhinus* (3), *Cydmæa* (17), *Œnochroma* (1), *Misophrice* (9), *Storeus* (34), *Cyttalia* (8), *Glaucopela* (2), and *Myositta* (3).

* Only 95 species have been expressly stated to occur in Tasmania.

Unless expressly stated to the contrary, specimens of all the new species have been taken by myself, and the localities (and food-plants where given) may be depended upon.

DESIANTHA MALEVOLENS, *n. sp.*

Piceous, legs and antennæ piceous-red. Upper-surface moderately closely covered with obscure ochreous and brown scales, the ochreous scales clothing sides of prothorax, and forming a distinct median line; scutellum with greyish scales; elytra with a wide dark sutural patch, the sides with paler scales, extreme margins with greyish and sooty-brown scales; a small distinct suboblong whitish spot on each elytron just before summit of posterior declivity. Under-surface and legs densely clothed with ashen scales, in which a few short stout pale setæ are mixed.

Head and rostrum densely punctate; a feeble depression between eyes. Rostrum arcuate, stout, rather short. Club elongate. *Prothorax* transverse, sides and base rounded, apex widely emarginate, and almost the width of base. *Elytra* widely emarginate at base, apex conjointly rounded, shoulders oblique; punctate-striate, punctures concealed; interstices feebly convex, wide, and regular. *Under-surface* densely punctate, punctures concealed. Prosternum feebly and widely emarginate in front. Intermediate intercoxal process descending at an angle of about 45°. Metasternum depressed in middle, the depression continued on to abdomen. Two basal segments of abdomen very large, third and fourth very short (their combined length being only about half that of the second or fifth), and arcuate at sides. *Legs* rather long; femora thick, subpedunculate; tibiæ falcate (the anterior very decidedly so), with numerous small teeth beneath; apex thin, terminal hook unusually long and sharp; tarsi with fourth joint shorter than the rest combined. Length (from apex of prothorax), $4\frac{3}{4}$ mm.; rostrum, 1 mm.; width, 2 mm.

Hab.—Swan River (Hon. J. G. H. Amherst).

This species, in the characters of its rostrum, abdomen, tibiæ, and tarsi, is somewhat at variance with the majority of species in *Desiantha;* and it may be eventually considered necessary to erect a new genus to receive both it and the following species; but as the genera closely allied to *Desiantha* are already so numerous, and some of them are founded on such trivial characters, I am strongly adverse at present to adding to their number. The species is reported to be very destructive to the young shoots of the vine, its work being much the same as that of *D. maculata.*

DESIANTHA VEGRANDIS, *n. sp.*

Piceous, legs and antennæ piceous-red. Upper-surface closely covered with muddy-brown scales, prothorax with the sides and

median line obscurely marked with paler scales ; scutellum with greyish scales ; elytra with greyish scales at sides and apex, and a small spot on each side beyond the middle. Under-surface more densely clothed with paler and longer scales ; tibiæ, especially the posterior, fringed beneath with long hair.

Structure as in the preceding species, but the elytra shorter and wider ; femora less thickened, anterior tibiæ less decidedly falcate, and claw joint the length of the other joints of each of the tarsi. Length, 3 mm.; rostrum, $\frac{3}{4}$ mm.; width, $1\frac{1}{2}$ mm.

Hab.—N.S.W.: Tamworth.

Closely allied to the preceding species, but may be at once distinguished by its smaller size and different clothing (especially of the under-surface).

Desiantha præmorsa, *n. sp.*

Piceous, legs piceous-red ; sterna, abdomen, and antennæ dull-red. Head closely covered with yellowish-brown setæ, at sides of eyes and of rostrum with whitish setæ ; muzzle fringed with long hairs ; prothorax and elytra densely covered with overlapping scales, more or less greyish in colour ; prothorax with a very distinct median line of whitish scales (tinged with green or gold), continued on to scutellum ; elytra with palest scales about posterior callosities, a feeble (but sufficiently distinct) oblique spot on each side beyond the middle, and not quite extending to suture. Above, in addition to the scales, with numerous setæ, darker on prothorax than on elytra, on the latter confined to the interstices, but not in single file ; below moderately densely setose.

Head finely punctate, a feeble depression between eyes. Rostrum stout, shorter than prothorax, wider at apex than at base ; with three moderately distinct costæ, and which are separated by double rows of punctures ; scrobe terminating abruptly at one-third its length from eye.* Scape the length of funicle, first joint of the latter longer than the two following combined ; club elongate-ovate, free. *Prothorax* transverse, very feebly convex, sides and base rounded, sides gradually enlarging from base to near apex, and then suddenly lessened, extreme apex scarcely the width of base ; apex somewhat raised in middle, and with a feeble semicircular depression immediately behind ; densely punctate, punctures concealed. *Elytra* wider than prothorax, base widely emarginate, apex conjointly rounded, shoulders rounded, sides almost parallel to near apex ; punctate-

* The rostrum, when viewed directly from above, appears as if each side had been quadrately excised immediately in front of the eyes ; when viewed from beneath there appears to be a strong tooth-like projection on each side. I know of nothing similar in any weevil.

striate, punctures almost concealed; interstices convex and regular, except that there is a strong and almost conical preapical callus on the fifth. *Under-surface* finely punctate. Prosternum rather deeply emarginate in front. Intermediate intercoxal process flat between coxæ, perpendicular in front. Abdomen with straight sutures, third and fourth segments conjointly longer than second or fifth. *Legs* rather stout; tibiæ as wide at apex as at base, somewhat curved at apex; claw joint as long as the rest combined. Length, $6\frac{1}{2}$ mm.; rostrum, 1 mm.; width, 3 mm.

Hab.—Sydney.

A peculiar species, which might be separated from *Desiantha* on account of the unique structure of the rostrum. Nine specimens were obtained in company under a rotting log.

DESIANTHA IRRASA, *n. sp.*

Male. Black, claws and base of scapes piceous-red. Upper-surface moderately densely clothed with short reddish-brown setæ, denser on elytral interstices than elsewhere: below with shorter and sparser setæ than above.

Head densely punctate, a small fovea between eyes. Rostrum the length of prothorax, dilated at apex, base slightly gibbous; densely punctate; sides feebly tricostate, costæ not visible from above. Antennæ slender; two basal joints of funicle elongate; club ovate, free. *Prothorax* scarcely transverse, slightly convex, base and sides rounded; densely punctate, punctures more or less confluent. *Scutellum* small, transverse, punctate. *Elytra* somewhat flattened, subovate, wider than prothorax, widest about middle, arcuate towards apex; base widely emarginate, each feebly produced at apex; striate-punctate, punctures large, oblong, comparatively shallow; interstices wide, granulate-punctate, slightly convex, suture, third, fifth, and seventh feebly raised; without preapical callosities. *Prosternum* rather deeply emarginate. Intermediate intercoxal process narrow, slightly raised in front. Metasternum coarsely punctate at sides, punctate and transversely wrinkled across middle. Abdomen densely and irregularly punctate, punctures smaller about middle of first and second segments than elsewhere, suture between these segments slightly curved; the other sutures deep and straight, third and fourth conjointly slightly longer than second or fifth; fifth concave, except at base. *Legs* moderately long; femora stout, the posterior subpedunculate; tibiæ somewhat curved, wider at apex than at base, with numerous small teeth beneath; claw joint as long as the rest combined. Length, 7 mm.; rostrum, 2 mm.; width, $3\frac{1}{4}$ mm.

Female. Differs in having the elytra conjointly rounded at apex, the abdomen with a depression on first and second

segments, the apical segment slightly convex, and the elytra comparatively longer and thinner.

Hab.—N.S.W.: Forest Reefs.

Numerous specimens were obtained under rotting logs. The rostrum in profile somewhat resembles that of *Nemestra incerta* from Western Australia. On an occasional specimen may be seen feeble pale lines at the sides of prothorax. I know of no closely allied species.

Desiantha mecaspis, *n. sp.*

Piceous, legs and antennæ piceous-red. Upper-surface (except of head and rostrum, which are sparsely clothed) very densely clothed with grey or muddy-grey scales, not quite uniform in colour, and intermingled with moderately long recurved setæ. Under-surface densely clothed at sides, more sparingly along middle. Legs with setose scales; each of the femora with a feeble ring of whitish scales.

Head densely punctate, a feeble longitudinal impression between eyes. Rostrum the length of prothorax, curved, slightly dilated at apex; densely punctate, with five feeble costæ. Antennæ comparatively slender; first joint of funicle moderately long; club ovate, subadnate to funicle. *Prothorax* feebly transverse, sides rounded, base feebly rounded, and but slightly wider than apex; densely punctate, punctures concealed. *Scutellum* oblong. *Elytra* wider than prothorax, widest across shoulders, apex conjointly rounded; punctate striate, punctures concealed; interstices slightly convex and regular, except that the fifth terminates in a distinct preapical callus. *Under-surface* moderately densely punctate. Prosternum rather deeply emarginate in front. Intermediate intercoxal process narrow throughout. Abdomen with third and fourth segments conjointly the length of second, and slightly longer than apical. *Legs* moderately long; femora stout, subpedunculate; anterior tibiæ bisinuate, and feebly dentate beneath; claw joint the length of the rest combined. Length, 5 mm.; rostrum, $1\frac{1}{4}$ mm.; width, 2 mm.

Hab.—Sydney.

Somewhat resembles *sericea* in appearance, but may be distinguished from that species by its narrower shape, differently coloured antennæ (in *sericea* the club is black), dentition of anterior tibiæ, &c.

Desiantha incontaminata, *n. sp.*

Piceous, legs and antennæ obscure piceous-red. Rather sparsely clothed with obscure ochreous or brownish scales. Under-surface with scales set in punctures—those on the sterna scarcely rising to the general level, and whitish; those on the

abdomen longer, subsetose, and yellowish—coxæ densely clothed; femora and tibiæ with yellowish setæ.

Head densely punctate, a narrow impression between eyes. Rostrum curved, the length of prothorax; densely punctate except at apex, with five costæ, of which the two outer on each side become conjoined beyond antennæ, and are continued (but feebly so) almost to apex. Antennæ slender; two basal joints of funicle elongate; club elliptic-ovate, free. *Prothorax* slightly longer than wide, sides equally rounded, base feebly rounded and slightly wider than apex; densely punctate, punctures round, and nowhere confluent. *Elytra* wider than prothorax, widest about shoulders, apex conjointly rounded; striate-punctate, punctures oblong, narrow, deep; interstices convex and regular, except that the fifth terminates in a very slight preapical callus. *Under-surface* densely punctate. Prosternum moderately deeply emarginate in front. Slope of intermediate intercoxal process rounded. Abdomen with third and fourth segments conjointly the length of fifth and slightly shorter than second. *Legs* moderately long; femora stout, subpedunculate; anterior tibiæ feebly bisinuate beneath, longer and thinner than the others, none dentate beneath; claw joint of all the tarsi shorter than the rest of the joints combined. Length, 8 mm.; rostrum, $2\frac{1}{2}$ mm.; width, $3\frac{1}{5}$ mm.

Hab.—N.S.W.: Burrawang (Mr. T. G. Sloane).

The claw-joint is shorter than usual, but not so short as in *Aoplocnemis*.

DESIANTHA MACULATA, *Blkb.*

I have this species from all the Australian Colonies. In Western Australia (including Rottnest Garden and Pelsart Islands) it is exceedingly abundant and destructive to various fruit-trees, but especially to the vine. It is variable, both as regards marking and size.

D. MAJOR, *Blkb.* *Hab.*—N.S.W.: Wilcannia.

D. SERICEA, *Blkb.* *Hab.*—N.S.W.; W.A.

D. OBSCURA, *Blkb.* *Hab.*—N.S.W.: Cootamundra, Queanbeyan, Sydney.

D. PARVA, *Blkb.* *Hab.*—Sydney.

D. VITTATA, *Blkb.* *Hab.*—N.S.W.: Forest Reefs.

D. PUSILLA, *Blkb.* *Hab.*—N.S.W.: Windsor.

D. CAUDATA, *Pasc.* *Hab.*—N.S.W.; V.

D. (BREXIUS) MURINA, *Pasc.* *Hab.*—Forest Reefs, Sydney.

ANORTHORHINUS* APICALIS, *n. sp.*

Black, subopaque; tarsi and apex of tibiæ pale-red; antennæ reddish-piceous. Sparsely clothed with sooty and grey scales, the latter feebly transversely arranged on elytra, and forming three feeble longitudinal lines on prothorax. Under-surface and legs with sparse pale scales, snowy on apex of tibiæ.

Head densely punctate. Rostrum with five costæ, three of which are placed on a median elevation. Antennæ moderately elongate. *Prothorax* longer than wide, apex the width of base, sides gently rounded; densely and coarsely punctate. *Elytra* twice the width of prothorax, shoulders square; striate-punctate, punctures quadrate and subapproximate, the third, fifth, and seventh interstices wider than the others, and raised especially near base; a preapical callus on each side. *Under-surface* densely and strongly punctate, punctures on metasternum perfectly circular. Prosternum feebly emarginate. Length, 4 mm.; rostrum, $\frac{3}{4}$ mm.; width, $1\frac{3}{4}$ mm.

Hab.—Tasmania (Mr. A. Simson, No. 2,925). N.S.W.: Galston (Lea).

May be readily distinguished by the colour of the apex of tibiæ and the coarse punctures of the under-surface.

ANORTHORHINUS ABJECTUS, *n. sp.*

Black, subopaque; tibiæ and tarsi of a pale-red, base of femora dark-red, antennæ piceous. Head and rostrum to eyes with whitish setose scales, a moderately dense stripe of similar scales on each side of prothorax; elytra with smaller scales rather evenly distributed. Under-surface and legs with whitish setæ.

Head densely punctate. Rostrum the length of prothorax, with five narrow costæ, which terminate at antennæ. Scape comparatively slender. *Prothorax* as in *apicalis*, but less coarsely punctate. *Elytra* twice the width of prothorax, shoulders somewhat oblique; striate-punctate, punctures rather large and subapproximate; interstices punctate, the third, fifth, and seventh very feebly raised, each side with a preapical callus. *Under-surface* rather finely punctate. Prosternum semicircularly emarginate in front. Length, $3\frac{1}{2}$ mm.; rostrum, $\frac{3}{4}$ mm.; width, $1\frac{1}{3}$ mm.

Hab.—Swan River.

Compared with the description of *Phrenozemia lyproides*, Pascoe, this species differs in having the scales without a pearly lustre, and the antennæ much darker than tibiæ.

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* I think it highly probable that this genus (possibly synonymous with *Phrenozemia*) will eventually be merged in *Desiantha*.

ANORTHORHINUS BREVICORNIS, *n. sp.*

Black, subopaque; antennæ and legs (middle of femora excepted) of a rather dark-red. Clothed with blackish setose scales; head with a small spot of whitish scales between eyes; prothorax with a few whitish ones about base; scutellum with white scales; elytra with numerous small distinct whitish spots —less numerous towards base than elsewhere. Under-surface with whitish setose scales. Femora with a ring of white scales at apex, the tibiæ with rings at base and apex.

Head and rostrum as in *apicalis*. Antennæ, especially the scape, short and thick. *Prothorax* scarcely longer than wide, sides feebly rounded, base and apex equal; densely and coarsely punctate. *Elytra* twice the width of prothorax, sides parallel to near apex, shoulders square; striate-punctate, punctures elongate, approximate; interstices flat, equal; without preapical callosities. *Under-surface* densely and rather coarsely punctate. Prosternum rather deeply emarginate in front. Length, $3\frac{3}{4}$ mm.; rostrum, $\frac{3}{4}$ mm.; width, $1\frac{1}{2}$ mm.

Hab.—W.A.: Rottnest Island.

The legs are prettily variegated, as in *pictipes*, but the rostrum and elytra are very different.

A. PICTIPES, *Blkb.* *Hab.*—N.S.W.: Tamworth, Forest Reefs.

Elytra with a preapical callus on each side.
  Tibiæ with only the apex red ... ... *apicalis*, n. sp.
  Tibiæ red.
    Elytra with pale scales condensed at apex, shoulders square ... ... *pictipes*, Blkb.
    Elytra almost uniformly clothed, shoulders oblique *abjectus*, n. sp.
Elytra without preapical callosities ... ... *brevicornis*, n. sp.

CYDMÆA RUFIPES, *n. sp.*

Black; rostrum, antennæ, and legs red. Upper-surface almost uniformly clothed with pale-ochreous or dark stramineous scales, feebly mixed with darker scales on elytra, in some specimens with a coppery or fiery gloss, and on the elytra occasionally tinged with green. Undersurface with white scales, occasionally tinged with green or having a coppery gloss.

Rostrum comparatively short; parallel-sided; rather strongly punctate at base; feebly elsewhere. Antennæ inserted considerably nearer apex than base of rostrum; funicle the length of scape, first joint as long as second-third combined, second considerably longer than third. *Prothorax* feebly transverse, apex about one-fourth less than base. *Elytra* short, cordate; rather strongly seriate-punctate; interstices flat, $\frac{1}{4}$ wide, finely punctate. Length 2 mm., rostrum $\frac{2}{3}$ mm.; width 1 mm.

Hab.—Swan River.

The shape and clothing are much as in *mixta* (Blackburn), but the rostrum is differently coloured, and the whole insect is smaller.

CYDMÆA TERAMOCERA, *n. sp.*

Black; antennæ, legs, and elytra dull-red. Prothorax with brownish scales, with others of a dull pale ochreous condensed at base and sides, elytra with reddish-brown scales becoming ochreous towards apex, and mixed with feeble transverse patches of whitish scales. Under-surface with white scales having a feeble purplish-green iridescence.

Rostrum long and thin, sides feebly but noticeably incurved between antennæ and apex; punctate to apex. Antennæ long and thin, inserted considerably nearer apex than base; funicle as long as scape, two basal joints together, first as long as second-third combined. *Prothorax* moderately transverse, considerably narrowed at apex. *Elytra* considerably wider than prothorax, short, cordate; striate-punctate, striæ very feeble, punctures moderately strong and distant. Length, $3\frac{1}{3}$ mm.; rostrum, $1\frac{1}{3}$ mm.; width, $1\frac{1}{2}$ mm.

Hab.—N.S.W.: Galston.

Considerably above the average size. The curvature of the sides of the rostrum between antennæ and apex exists perhaps in most of the species of *Cydmæa*, but in most it is so very feeble as to be scarcely noticeable.

CYDMÆA FILIROSTRIS, *n. sp.*

Black; antennæ pale, tibiæ dark-red. Upper-surface clothed with pale stramineous scales, having a greenish or coppery gloss, and with a few brownish scales scattered about. Under-surface with white scales, having a greenish gloss or a feeble purplish-green iridescense. Head and base of rostrum densely squamose.

Rostrum long and very thin, sides noticeably incurved between antennæ and apex. Antennæ moderately stout, inserted nearer apex than base of rostrum, funicle longer than scape, first joint longer than second-third combined. *Prothorax* moderately transverse, apex not much narrower than base. *Elytra* oblong-cordate; seriate-punctate; each interstice feebly seriate-punctate. Length, $2\frac{1}{3}$ mm.; rostrum, 1 mm.; width, $1\frac{1}{8}$ mm.

Hab.—Swan River.

CYDMÆA BINOTATA, *n. sp.*

Black; scape dull-reddish-brown, funicle and club piceous-black. Above with dingy-white and blackish-brown scales irregularly distributed on prothorax, a feeble dark longitudinal stripe and four dark spots across apex, and two across base, but none of them distinct; each elytron with a moderately large,

rounded, distinct white spot (at about the apical third), surrounded by blackish scales, and which are continued across suture. Under-surface with white scales feebly tinged with green.

Rostrum moderately stout, slightly longer than prothorax, very feebly decreasing from base to apex. Antennæ comparatively stout, inserted slightly nearer apex than base of rostrum; funicle slightly longer than scape, first joint as long as second-third combined. *Prothorax* distinctly transverse, apex feebly but rather suddenly lessened; ocular lobes more prominent than usual. *Elytra* oblong-cordate, seriate-oblong-punctate; interstices not very wide. Length, 2 mm.; rostrum, $\frac{3}{4}$ mm.; width, 1 (vix) mm.

Hab.—Sydney.

A much smaller species than *bimaculata* (Pascoe), the elytral spots white, and nearer apex than base.

CYDMÆA MŒRENS, *n. sp.*

Black. Scales of upper-surface entirely black, except for a very few whitish scales (invisible to the naked eye). Clothing of under-surface dull-white, in an occasional specimen feebly tinged with green, or with a faint coppery lustre; legs with whitish scales.

Rostrum slightly longer than prothorax in female, in male as long; very feebly decreasing in width from base to apex. Antennæ inserted almost in exact middle of rostrum; scape rather short, first joint of funicle longer than the following combined. *Prothorax* moderately transverse, apex narrowed. *Elytra* about once and one-fourth wider than prothorax; seriate-punctate; interstices wide, flat, feebly punctate. Length, $2\frac{1}{6}$ mm.; rostrum, $\frac{4}{5}$ mm.; width, 1 mm.

Hab.—W.A.: Swan River, Darling Ranges, Bridgetown, Geraldton.

Of the build of *luctuosa* and *diversa*, but very differently coloured.

CYDMÆA INCONSPICUA, *n. sp.*

Black. Clothed with brown and greenish-white scales, more rounded than is usual in the genus; on the prothorax the brown scales prevail on the disc, and the white scales at the sides; on the elytra the white scales almost run in lines from base to apex. Under-surface with white scales.

Rostrum longer than prothorax, thin and subcylindrical. Antennæ elongate, inserted in exact middle of rostrum; funicle the length of club, first joint longer than second-third combined. *Prothorax* as long as wide, apex rounded and much narrower

than base. *Elytra* cordate, indistinctly seriate-punctate. Length, 2 mm.; rostrum, $\frac{4}{5}$ mm.; width, $1\frac{1}{6}$ mm.

Hab.—Swan River.

Close to *diversa*, but the front coxæ separated.

Cydmæa dorsalis, *n. sp.*

Black; tibiæ and tarsi reddish-piceous. Prothorax with chocolate-brown scales on disc, feebly interrupted by lines of pale scales, sides with pale scales; elytra with whitish scales, tinged with brown along suture and towards apex; each with a large dark chocolate-brown patch covering the second-eighth interstices, its posterior end well-defined and just before middle, its anterior margin not sharply defined. Under-surface and legs with white scales.

Rostrum longer than prothorax, thin and parallel-sided; the sides, even beyond antennæ, punctate. Antennæ moderately long, inserted nearer apex than base of rostrum; funicle the length of scape, first joint as long as second-third combined, second scarcely longer than third. *Prothorax* moderately transverse, apex about one-fourth less than base. *Elytra* cordate, feebly striate-punctate, interstices wide and very feebly convex. Length, $2\frac{1}{2}$ mm.; rostrum, 1; width, $1\frac{1}{3}$ mm.

Hab.—W.A.; Mount Barker.

A well-marked species, above the average size. In this and all the following species the anterior coxæ are contiguous, in all the preceding they are separated.

Cydmæa fasciata, *n. sp.*

Black. Scales of upper surface black, with white (sometimes tinged with green) scales between eyes, forming a distinct patch on each side of prothorax at base, a feeble cluster in middle of apex, moderately densely clothing base of elytra or condensed into four rather feeble patches continued along suture to apex, and forming a distinct transverse fascia (slightly irregular about suture) just behind middle. Under-surface with white scales, either tinged with green or having a feeble coppery lustre.

Rostrum slightly longer than prothorax, thin, and parallel-sided. Antennæ inserted almost in exact middle of rostrum; funicle slightly longer than club, first joint as long as three following combined. *Prothorax* distinctly transverse, apex about one-third less than base. *Elytra* short, oblong cordate; indistinctly seriate-punctate, punctures strong but almost concealed. Length, $1\frac{3}{4}$ mm.; rostrum, $\frac{3}{4}$ mm.; width, $\frac{5}{6}$ mm.

Hab.—W.A.: Swan River, Darling Ranges.

Allied to *luctuosa* (Pascoe) but somewhat shorter and broader, prothorax more transverse, &c. The white scales are somewhat

differently disposed, and the elytra are without the pale-brown scales along suture and towards base, which, though varying in extent, appear to be constant in *luctuosa*.

CYDMÆA UNIFORMIS, *n. sp.*

Black; antennæ piceous-brown. Upper-surface regularly clothed with white scales, more or less tinged with green. Scales of under-surface and legs bright pale-green.

Rostrum no longer than prothorax, comparatively stout, parallel-sided. Antennæ moderate, inserted slightly nearer base than apex of rostrum; funicle larger than club, first joint longer than second-third combined. *Prothorax* moderately transverse, apex about one-third less than base. *Elytra* longer than is usual in the genus, subcylindrical, very little wider than prothorax. Length, 2 mm.; rostrum, $\frac{2}{3}$ mm.; width, $\frac{7}{8}$ mm.

Hab.—W.A.: Bunbury, Bridgetown.

The elytra appear to be multi-striate, owing to the colour and disposition of the scales, setæ, and punctures. The species is allied to *viridula* (Pascoe), but differs in the prothorax being shorter, distinctly broader at the base, and but little narrower than the elytra, the latter subcylindrical, &c. The clothing, also, is much denser.

CYDMÆA CARA, *n. sp.*

Black; apical half of rostrum and tibiæ dark-red, antennæ dull-red, scape paler. Prothorax with blackish-brown scales, a few white ones on disc, and dense (tinged with yellowish-brown) at the sides; elytra with blackish and white scales irregularly mixed; the black scales prevailing, except near apex and base; a distinct and moderately wide, straight, transverse white fascia behind the middle. Under-surface and legs with glossy silvery scales.

Rostrum long and thin, almost imperceptibly incurved between antennæ and apex; punctate to apex. Antennæ long and thin, inserted very little nearer apex than base; funicle the length of scape, first joint longer than second-third combined. *Prothorax* feebly transverse, apex rather suddenly lessened and subtuberculate. *Elytra* cordate, distinctly seriate-punctate; interstices not very wide. Length, $2\frac{1}{2}$ mm.; rostrum, 1 mm.; width, $1\frac{1}{4}$ mm.

Hab.—W.A.: Geraldton.

A well-marked species, slightly above the average size.

CYDMÆA ROSTRALIS, *n. sp.*

Black; apical two-fifths of rostrum reddish, tibiæ darker; antennæ pale red, club darker. Head and base of rostrum densely squamose. Prothorax and elytra with pale yellow, or greenish white, or coppery scales, or even with a feebly rosy

gloss; on the prothorax three feeble (often obliterated) lines of darker scales; on the elytra usually with moderately distinct small patches of brown scales, more distinct to the naked eye than under a lens. Under-surface seldom with pure white scales; frequently they are of a vivid green, occasionally even blue, and often with a coppery-green or purplish iridescence.

Rostrum considerably longer than prothorax, and very thin; very distinctly incurved between antennæ and apex. Antennæ elongate, inserted slightly nearer apex than base of rostrum; funicle longer than scape, first joint as long as second-third combined, second almost twice the length of third. *Prothorax* moderately transverse, apex about one-fourth less than base. *Elytra* oblong-cordate, moderately strongly seriate-punctate. Length, $2\frac{1}{2}$ mm.; rostrum, 1 mm.; width, $1\frac{1}{4}$ mm.; variation in length, $2\frac{1}{4}$—$2\frac{3}{4}$ mm.

Hab.—Swan River.

Cydmæa hakeæ, *n. sp.*

Black; apical half of rostrum of a rather bright red, antennæ paler, tibiæ darker. Clothing much as in the preceding species, but less glossy.

Rostrum moderately long and thin, parallel-sided, rather strongly punctate to apex. Antennæ comparatively stout, inserted at one-third from apex of rostrum; funicle as long as club, first joint longer than second-third combined, second and third subequal. *Prothorax* moderately transverse, apex about one-fourth less than base. *Elytra* oblong-cordate; rather strongly seriate-punctate. Length, $2\frac{1}{3}$ mm.; rostrum, $\frac{4}{5}$ mm.; width, $1\frac{1}{6}$ mm.; variation in length, $2\frac{1}{4}$—$2\frac{1}{2}$ mm.

Hab.—Swan River (on *Hakea trifurcata*).

Cydmæa modesta, *n. sp.*

Black; apical half of rostrum and tibiæ dark-red, antennæ of a dingy-red, club darker. Upper-surface almost uniformly clothed with whitish scales, having a feeble greenish tinge, and in places feebly mixed with brown scales. Beneath and legs with white scales, distinctly tinged with green.

Rostrum long, moderately thin, parallel-sided, punctate to apex. Antennæ long, inserted slightly nearer apex than base of rostrum; funicle the length of scape, first joint longer than second-third combined, second almost twice the length of third. *Prothorax* rather strongly transverse, subcylindrical, apex very little narrower than base. *Elytra* oblong-cordate, moderately distinctly seriate-punctate, interstices feebly convex, not very wide. Length, $2\frac{1}{4}$ mm.; rostrum, 1; width, $1\frac{1}{6}$ mm.

Hab.—Swan River.

Close to *uniformis (ante)*, but the rostrum not entirely black.

Cydmæa grisea, *n. sp.*

Black ; apical two-fifths of rostrum and the tibiæ dark-red, antennæ (including club) paler. Above with whitish scales, which on the elytra are feebly mixed with brown scales, placed in small transverse series, but which scarcely interfere with the prevailing colour. Scales of under- of a more pure white than of upper- surface.

Rostrum long, moderately thin, parallel-sided ; strongly punctate to apex. Antennæ long, inserted nearer apex than base of rostrum ; funicle slightly longer than club, first joint as long as second-third combined, second considerably longer than third. *Prothorax* feebly transverse, apex strongly lessened and subtubular, base almost perfectly straight. *Elytra* briefly oblong-cordate ; indistinctly seriate-punctate. Length, $2\frac{3}{5}$ mm.; rostrum, $1\frac{1}{8}$ mm.; width, $1\frac{1}{3}$ mm.

Hab.—Swan River.

Cydmæa brevicornis, *n. sp.*

Black ; rostrum piceous-brown, apical half paler, legs and antennæ red. Upper-surface with coppery-yellow scales, feebly interrupted by small spots or stripes of darker scales. Under-surface with pale coppery-green scales.

Rostrum long, thin, sides very feebly decreasing from base to apex. Antennæ comparatively short, inserted distinctly closer to apex than base of rostrum ; funicle noticeably longer than scape (which is rather short), first joint as long as second-fourth combined. *Prothorax* slightly transverse, apex about one-third less than base. *Elytra* briefly cordate, distinctly seriate-punctate. Length, $2\frac{1}{5}$ mm.; rostrum, $\frac{3}{4}$ mm ; width, 1 mm.

Hab.—W.A.: Darling Ranges.

Cydmæa eucalypti, *n. sp.*

Piceous ; elytra dark-reddish-brown, rostrum red, becoming slightly darker towards base ; legs and antennæ red. Prothorax with chocolate-brown scales, forming a large rounded discal patch (usually well-defined), and a small spot on each side at apex ; greenish-white or yellowish scales elsewhere ; elytra with chocolate-brown (much darker in some specimens than in others) scales occupying the greater part of their surface, and condensed into irregular patches, especially towards base ; elsewhere with whitish scales, more or less tinged with yellow or pale-brown. Under-surface with white scales.

Rostrum long, thin, parallel-sided. Antennæ long, thin, inserted at about one-third from apex of rostrum ; funicle the length of or very slightly shorter than club, first joint as long as second-fourth, second as long as third-fourth. *Prothorax* rather

strongly transverse, apex about one-fourth less than base. *Elytra* cordate; rather strongly seriate-punctate, interstices not very wide, and very feebly convex. Length, $2\frac{2}{5}$ mm.; rostrum, $1\frac{1}{8}$ mm.; width, $1\frac{1}{4}$ mm.; variation in length, 2—$2\frac{3}{4}$ mm.

Hab.—Swan River, Bridgetown (on young *Eucalypti*).

The scales of the under-surface in all the specimens (eight) under examination are uniformly white, not at all tinged with green or other colour, as is so frequently the case; the size is variable, and the disposition and extent of the dark scales on the elytra are very much so. The species to a certain extent agrees with the description of *selligera* (Pascoe), but the rostrum of that species is described as "nigra."

CYDMÆA NYMPHOIDES, *n. sp.*

Piceous; elytra reddish-brown, rostrum brownish-red, antennæ pale-red, legs slightly darker. Prothorax with coppery-yellow scales, feebly mixed with chocolate on the disc; elytra with pale scales, a few snowy ones about suture, brownish scales towards apex and sides, and a moderately well-defined chocolate brown patch on each side towards base.

Rostrum long and very thin, very feebly dilated from antennæ to apex. Antennæ as in preceding. *Prothorax* feebly transverse, apex about one-third less than base. *Elytra* oblong-cordate, rather longer than is usual in the genus; feebly striate, interstices narrow. Length, $2\frac{2}{3}$ mm.; rostrum, 1; width, $1\frac{1}{4}$ mm.

Hab.—W.A.: Pinjarrah.

The disposition of the scales on the elytra gives this species a strong resemblance to the pupæ of many small bugs, especially of the family LYGÆIDÆ.

C. BIMACULATA, *Pasc.*; Mast. Cat. Sp., No. 5,134. *Hab.*—Sydney: Blackheath.

C. VIRIDULA, *Pasc.; l.c.*, 5,139. *Hab.*—Swan River: Donnybrook.

C. LUCTUOSA, *Pasc.; l.c.*, 5,135. *Hab.*—W.A.; N.S.W.

C. NOTATICOLLIS, *Pasc.; l.c.*, 5,136. *Hab.*—Geraldton.

C. PUSILLA, *Pasc.; l.c.*, 5,137. *Hab.*—N.S.W.; W.A.

C. OBSCURA, *Blkb.*; P.L.S., N.S.W., 1890, p. 339. *Hab.*—Adelaide.

C. DIVERSA, *Blkb.; l.c.*, p. 340. *Hab*—N.S.W.; W.A.

C. LINEATA, *Blkb.; l.c.*, 584. *Hab.*—Galston.

C. MAJOR, *Blkb; l.c.*, 1893, p. 189. *Hab.*—Galston.

C. MIXTA, *Blkb.;* T.R.S., S.A., 1894, p. 158. *Hab.*—Sydney: Como

I append a tabulation of the species herein described, using for convenience' sake Mr. Blackburn's main divisions when tabulating the species known to him.*

Front coxæ separated.
  Rostrum red ... ... *rufipes.*
  Rostrum black.
    Antennæ red.
      Derm of elytra red ... ... *teramocera.*
      Derm of elytra black ... ... *filirostris.*
    Antennæ with reddish-brown scape and blackish funicle *binotata.*
    Antennæ black.
      Clothing of upper-surface almost entirely black ... *mœrens.*
      Clothing less dark ... ... *inconspicua.*
Front coxæ contiguous.
  Rostrum entirely black.
    Upper-surface with well-defined spots or stripes.
      Elytra with two chocolate brown spots ... ... *dorsalis.*
      Elytra fasciate ... ... *fasciata.*
    Upper-surface uniform ... ... *uniformis.*
  Rostrum red or piceous-black, and more or less diluted with red towards apex.
    Femora piceous, or at least considerably darker than tibiæ.
      Elytra with a transverse post-median fascia ... *cara.*
      Elytra not fasciate.
        Funicle with second and third joints subequal ... *hakeæ.*
        Funicle with second joint considerably longer than third.
          Sides of rostrum distinctly incurved between antennæ and apex ... ... *rostralis.*
          Sides of rostrum straight.
            Prothorax subcylindrical ... ... *modesta.*
            Prothorax much wider at base than at apex ... *grisea.*
    Femora and tibiæ uniformly red.
      Scape shorter than funicle ... ... *brevicornis.*
      Scape the length of funicle.
        Eyes touching rostrum ... ... *eucalypti.*
        Eyes not touching rostrum ... ... *nymphoides.*

Œnochroma triquetra, *n. sp.*

Reddish-castaneous; prothorax piceous-brown; sterna slightly darker than abdomen. Each elytron with ten spots of pale orange-coloured scales; of these four are lateral and somewhat angular, two are sutural, of which one at one-third from base is round, and the other near apex suboblong; three round humeral spots, of which one is just within the shoulder; the tenth spot is on the fourth-sixth interstices at about the apical third; a few yellowish scales scattered about. Under-surface with orange-coloured setose scales, more or less condensed at sides of meso- and metasternum, and between anterior and intermediate coxæ.

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* In P.L.S., N.S.W., 1890, p. 341.

Head feebly punctate. Rostrum long, rather feebly punctate. *Prothorax* longer than wide, sides equally rounded; densely and rather strongly granulate. *Elytra* subtriangular; sides and shoulders feebly rounded, base about once and one-half wider than prothorax; punctate-striate, punctures rather large, subcontiguous, partially concealed; interstices feebly convex, slightly wider than punctures; densely and rather minutely granulate. *Under-surface* rather sparsely punctate, a feeble depression in middle of and common to first and second abdominal segments, and a rather more distinct impression on apical. Length, $4\frac{2}{3}$ mm.; rostrum, $1\frac{2}{3}$ mm.; width, 2 mm.

Hab.—N.S.W.: Richmond River.

Differs from *rubeta* (Pascoe) in the colour of the prothorax and under-surface (in that species the meso- and metasternum are black), the shape of the elytra (in *rubeta* the sides are subparallel to about the apical third, in the above they decrease in width from the shoulders), and in the number, colour, and disposition of the spots. The shape of the head, rostrum, prothorax, and legs are much alike in both species.

Misophrice.

Of the Australian *Erirhinidæ*, three genera (*Misophrice*, *Thechia*, and *Anarciarthrum*) are noted by Mr. Blackburn as having triarticulate tarsi. *Anarciarthrum*, as it appears to me, can scarcely be maintained; it differs from *Misophrice* in having the funicle composed of five joints only. I think the genus, of which only one species is known, should be regarded as forming a section of *Misophrice*. *Thechia*,* apparently unknown to Mr. Blackburn, (as it is to me), is described as having a seven-jointed funicle; the impression left on my mind after examining Mr. Pascoe's description of *T. pygmæa* is that it is an insect strongly resembling *dispar*, *munda*, and other species of *Misophrice*. I hardly think it desirable to establish several genera on species having such a very strong character as the absence (or apparent absence rather) of the claw-joint in common; at least without other and very strongly marked peculiarities, and the species of a number of genera are known to vary in the number of joints in the funicle.

Misophrice alternata, *n. sp.*

Piceous-black; scape and first joint of funicle red; elytra, abdomen, and legs dull dark-red. Clothed with dull whitish scales, comparatively dense on prothorax, moderately dense on third, fifth, and seventh interstices of the elytra, but feeble,

* In Master's Catalogue, as *Trechia*, to *T. pygmæa* (No. 5,204) add Plate iii., fig. 16.

except for a few spots, on the others; lateral and transverse margins of the sterna rather densely clothed; almost tufted between eyes. Clothed, in addition, with long, erect, brownish setæ.

Rostrum longer than prothorax, feebly incurved between antennæ and apex; grooved and densely punctate at base, subseriately punctate at sides. Scape inserted slightly nearer base than apex of rostrum, the length of five basal joints of funicle; first and second joints of funicle* subequal in length, but the first much thicker than second. *Prothorax* transverse, convex, sides rounded and increasing to base; densely and strongly punctate. *Elytra* slightly wider than prothorax, sides subparallel to near apex; seriate-punctate, punctures moderately large, subquadrate; interstices scarcely convex, wider than punctures, very feebly punctate. *Prosternum* rather strongly emarginate at apex. Abdomen convex. Front *coxæ* as widely separated as intermediate; third tarsal joint more than twice as wide as long. Length (from apex of prothorax), $3\frac{1}{3}$ mm.; rostrum, 1 mm.

Hab.—Sydney.

Appears to be closer to *hispida* (Pascoe) than to any other species, but it must be very distinct from that one, judging from both the generic and specific diagnoses. In Mr. Blackburn's tabulation it would fall besides *argentata* (Blackburn), from which it differs in shape, colour, clothing, punctures, setæ, &c.

MISOPHRICE SQUAMIBUNDA, *n. sp.*

Dull-red; under-surface (abdomen excepted) darker; rostrum red, club and tarsi piceous. Densely clothed with soft whitish scales, the elytral suture with denser and almost snowy scales; under-surface more sparsely clothed than upper; rostrum glabrous. Clothed in addition with short decumbent setæ.

Rostrum but little (if at all) longer than prothorax; punctate and grooved at base, rather feebly punctate elsewhere. Scape inserted nearer base than apex of rostrum, shorter than funicle; first joint of funicle large and thick, slightly longer than two following combined, third-sixth subglobular. *Prothorax* transverse, sides feebly incurved to apex, and increasing to base; densely punctate. *Elytra* very little wider than prothorax, sides parallel to apical fourth, thence cordate to apex; apex wide; striate-punctate, punctures concealed. *Prosternum* strongly emarginate in front. Abdomen feebly concave in middle. Separation of front and middle *coxæ* equal. Length, 2 (vix) mm.; rostrum, $\frac{1}{3}$ mm.

Hab.—N.S.W.: Tamworth.

* In this and all the following species the funicle is six-jointed.

The clothing is so dense that the colour and sculpture, except of the rostrum, can only be seen by disarranging the scales. The species would fall besides *parallela* in Mr. Blackburn's tabulation. With it, however, it has very little in common.

MISOPHRICE VIRIDISQUAMA, *n. sp.*

Black ; abdomen piceous-red, antennæ piceous ; rather sparsely clothed with vivid green scales, the elytral interstices each with a single line of scales, rostrum glabrous ; under-surface with green scales at the sides behind the mesosternum ; elsewhere irregularly clothed.

Rostrum considerably longer than prothorax, parallel-sided towards apex, base grooved ; towards apex with oblong, distant, seriate punctures. Scape inserted distinctly nearer base than apex of rostrum, much shorter than funicle ; first joint of funicle large, obconic, longer than second-third combined, second-sixth subcylindrical, feebly decreasing in length. *Prothorax* transverse, apex about one-fifth narrower than base ; densely and strongly punctate. *Elytra* considerably wider than prothorax, shoulders square, sides feebly increasing to beyond the middle, apex emarginate ; striate-punctate, punctures large, subquadrate, subapproximate ; interstices convex, as wide, wider, or narrower than punctures according to position, rather densely punctate. *Prosternum* scarcely visibly emarginate. Basal segments of abdomen flattened in middle or very feebly concave. Front *coxæ* less distinctly separated than the middle pair. Length, $1\frac{4}{5}$ mm.; rostrum, $\frac{5}{8}$ mm.

Hab.—Sydney.

Differs from *Anarciarthrum viride* (which it resembles to a remarkable degree both as regards sculpture and clothing), in having thinner legs, slightly sparser clothing, shorter rostrum, decidedly shorter scape (and which is inserted nearer the base of rostrum), longer and different punctures of rostrum, and in the number of joints in the funicle. I can by no means regard the two species as belonging to different genera. The head of each species, *when removed from the prothorax**, is exactly of the same shape, and (except in the other species of *Misophrice* having the apex of prothorax wide) is different to that of any other species with which I am acquainted in the subfamily.

MISOPHRICE VITIATA, *n. sp.*

Reddish ; head, meso- and mesosternum, scutellum and club black ; rostrum dark-red, antennæ pale red, apical joints of club infuscate ; elytra blotched with piceous beyond the middle, the

* The head (except as to the eyes) resembles to a certain extent that of *Moysitta cirrifera* and other species of that genus, *when in position.*

blotch not extending to apex. Clothed with yellowish setose scales, moderately dense on head and extreme base of rostrum, sparser on prothorax, and forming longitudinal and more or less distinct spots at the base, middle and near apex of third and fifth elytral interstices, sides of elytra very sparsely clothed; under-surface with whiter and rather denser scales than above, but very sparse in middle of metasternum and two basal segments of abdomen.

Rostrum considerably longer than head, slightly dilated at apex; grooved and punctate at base, subseriately punctate elsewhere. Scape slightly nearer base than apex of rostrum, fully the length of funicle; first joint of funicle as long as three following combined, at its apex almost the width of apex of scape. *Prothorax* transverse, sides decreasing towards apex, parallel beyond middle; densely punctate. *Elytra* not much wider than prothorax at base, shoulders rounded, widest about one-third from apex; interstices convex, wider or narrower than punctures, feebly punctate. *Prosternum* scarcely emarginate in front. Basal segments of abdomen feebly concave. Length, $2\frac{1}{8}$ mm.; rostrum, 1 (vix) mm.

Hab.—Sydney.

A very distinct species.

MISOPHRICE CYLINDRICA, *n. sp.*

Black; rostrum piceous-black, elytra dark-red, base and suture black, abdomen and legs piceous-red, tarsi darker. Sparsely clothed with whitish setose scales, having a golden or coppery lustre.

Rostrum extending to posterior coxæ, cylindrical, rather less strongly curved than is usual in the genus; rather feebly punctate, scarcely grooved at base. Scape inserted distinctly nearer base than apex of rostrum, shorter than funicle; first joint of the latter as long as three following combined, second-sixth subcylindrical. *Prothorax* subquadrate, apex almost exactly the width of base, sides very feebly rounded; densely and strongly punctate; with a very feeble median line. *Elytra* subcylindrical, very little wider than prothorax, sides subparallel to near apex, shoulders rounded, apex entire; striate-punctate, punctures quadrate, approximate; interstices moderately strongly convex, narrower than punctures, finely punctate. *Prosternum* widely and feebly emarginate in front. Abdomen slightly concave. Length, $1\frac{1}{3}$ mm.; rostrum, $\frac{1}{2}$ mm.

Hab.—W.A.: Geraldton.

In general appearance, except as to colour, strongly resembles *parallela*.

Misophrice nigriventris, *n. sp.*

Black ; elytra dark-red, a large basal portion and the suture black ; scape, first joint of funicle and femora (knees excepted) red. Very sparsely (moderately at sides, both of upper and under-surfaces) clothed with dingy greenish white scales.

Rostrum slightly longer than prothorax, grooved throughout. Scape inserted slightly nearer base than apex of rostrum, subequal in length with funicle ; first joint of the latter large, thick, longer than two following combined, fourth-sixth transverse. *Prothorax* transverse, sides increasing to near base ; densely punctate. *Elytra* wider than prothorax, dilated posteriorly, apex entire; punctate as in preceding species. *Prosternum* very feebly emarginate. Abdomen feebly concave. Length, $1\frac{1}{4}$ mm.; rostrum, $\frac{1}{3}$ mm.

Hab.—Swan River, Rottnest Island.

The black abdomen will serve to distinguish this species from most of its congeners ; in colour (except of abdomen) and sculpture it much resembles *oblonga*.

Misophrice clathrata, *n. sp.*

Coloured as the preceding, except that the abdomen is of a rather bright piceous-red. Sparsely clothed (very sparsely on elytra, except at base and sides) with bright metallic scales, sometimes green, sometimes coppery-green or golden.

Rostrum longer than prothorax, grooved throughout. Scape slightly nearer base than apex of rostrum, the length of funicle ; first joint of funicle thick, as long as two following combined, fifth-sixth strongly transverse. *Prothorax* slightly transverse, feebly decreasing at apex, sides very feebly rounded towards base ; densely punctate. *Elytra* considerably wider than prothorax, shoulders almost square, sides parallel (or almost so) to near apex; striate-punctate, punctures (especially at the base) very large, considerably wider than interstices ; these slightly convex and finely punctate. *Prosternum* scarcely visibly emarginate. Abdomen very feebly convex. Length, 1 mm.; rostrum, $\frac{1}{5}$ (vix) mm.

Hab.—Geraldton, Swan River.

The smallest species hitherto described, and very distinct amongst those of similar clothing and colour.

Misophrice dissentanea, *n. sp.*

Dark piceous-brown ; elytra red, a sub-triangular basal patch and the suture dark ; antennæ (club infuscate), legs (knees and tarsi infuscate) and abdomen of a rather bright red. Head with dull-whitish scales, scales of similar appearance elsewhere but extremely sparse.

Rostrum the length of prothorax, grooved throughout. Scape inserted slightly nearer apex than base of rostrum, first joint of funicle large, thick, the length of second-third combined. *Prothorax* transverse, sides rounded, base but little wider than apex; densely and strongly punctate. *Elytra* wider than prothorax, feebly dilating posteriorly, shoulders somewhat rounded; striate-punctate, punctures large, sub-quadrate and wider than interstices at base, towards apex much feebler and much narrower than interstices. *Prosternum* scarcely visibly emarginate; metasternum strongly punctate, a very distinct depression in its middle and which is continued on to abdomen. Length, $1\frac{1}{2}$ mm.; rostrum, $\frac{1}{3}$ mm.

Hab.—Swan River.

The punctures almost disappear at the apex of elytra, the striæ there being very distinct.

MISOPHRICE FENESTRATA, *n. sp.*

Colour much as in the preceding, except that the dark parts are black and the elytra are more testaceous than red. Moderately clothed with dull white (in an occasional specimen feebly tinged with green) scales and forming feeble lines on elytra; under-surface (except at sides) very sparsely clothed, the scales having a feeble greenish or coppery lustre.

Rostrum slightly longer than prothorax, grooved behind and slightly in front of antennæ. Scape nearer base than apex of rostrum, the length of funicle; first joint of the latter large and thick, slightly longer than the second-third combined. *Prothorax* transverse, sides almost straight, base but little wider than apex. *Elytra* wider than prothorax, sides very feebly dilating posteriorly; striate-punctate, punctures very large, quadrate, sub-approximate; interstices convex, narrower than punctures, densely punctate. *Prosternum* scarcely visibly emarginate. Basal segments of abdomen feebly concave. Length, $1\frac{1}{2}$ mm. (vix); rostrum, $\frac{1}{2}$ mm.

Hab.—Swan River.

Resembling the preceding to a certain extent, but with paler elytra, the punctures of which are much larger and more regular, insertion of scape different, &c.

M. QUADRATICOLLIS, *Blkb.* *Hab.*—Swan River.

M. MUNDA, *Blkb.* *Hab.*—Beverley.

M. ARGENTATA, *Blkb.* *Hab.*—S.A.

M. VARIABILIS, *Blkb.* *Hab.*—S.A.

M. SUBMETALLICA, *Blkb.* *Hab.*—S.A.

M. PARALLELA, *Blkb.* *Hab.*—N.S.W., T., W.A.

M. OBLONGA, *Blkb.* *Hab.*—Sydney.

M. DISPAR, *Blkb.* *Hab.*—Sydney, Tamworth, Forest Reefs.

M. SPILOTA, *Blkb.* *Hab.*—Tweed River.

ANARCIARTHRUM VIRIDE, *Blkb.* *Hab.*—Swan River.

As Mr. Blackburn has tabulated the species described by him, I have not considered it necessary to include his species in the following table :—

First and second joints of funicle subequal in length ... *alternata.*
First joint of funicle twice the length of second.
  Derm almost concealed beneath scales and setæ ... *squamibunda.*
  Derm but slightly clothed.
    Prothorax and elytra black ... ... *viridisquama.*
    Prothorax and elytra reddish ... ... *vitiata.*
    Prothorax black, elytra more or less red.
      Elytra scarcely wider than prothorax, body subcylindrical ... ... *cylindrica.*
      Elytra distinctly wider than prothorax, body subovate.
        Abdomen black ... ... *nigriventris.*
        Abdomen more or less red.
          Prothoracic scales metallic, size very small ... *clathrata.*
          Prothoracic scales dull, size larger.
            Scape inserted nearer apex than base of rostrum ... ... *dissentanea.*
            Scape nearer base than apex ... ... *fenestrata.*

STOREUS.*

In describing this genus, Schönherr evidently regarded the dentition of the femora as of secondary importance, as, of the two species referred to it, *variegatus* has dentate, and *signatus*† edentate, femora. Apparently, also, he was only acquainted with the male sex, as the rostrum is described as being the length of the head and prothorax combined, not, as it certainly is in the female of *variegatus*, considerably longer.

No species have been referred to the genus since it was first characterised, but subsequently‡ Mr. Pascoe proposed the genus *Emplesis*, to which he referred five species in all; to these Herr J. Faust has added one, and the Rev. T. Blackburn eleven species. Of these I know *filirostris* (Pascoe), *monticola*, *munda*, *gravis*, *majuscula*, and *assimilis* (Blackburn).

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* Schön. Gen. Curc., VII. (2), p. 293; Lacord. Gen. Col. VI., p. 494.

† This species does not appear to be known to Australian entomologists. I have not been enabled to identify it from amongst the numerous species of Erirhinidæ in my possession, although I have repeatedly searched for it; the majority of the species, however, appear to me to be very local in distribution. Judging by the description, it appears to be allied to *Emplesis majuscula*, or possibly *E. monticola*. In size it is stated to be a little larger than *Erirhinus pectoralis*.

‡ Trans. Ent. Soc., 1870, p. 194.

Of *Storeus* and *Emplesis*, Mr. Blackburn remarks* :—"The two genera appear to me to be very close to each other, and I cannot find any more exact structural difference than that the form of *Emplesis* is much more narrow and oblong, and that its second ventral segment is evidently less abbreviated than in *Storeus*." In his tabulation of the Erirhinid genera,† the two are separated by the femora of *Storeus* being dentate, and edentate in *Emplesis*.

An examination of extensive material (over 60 species, of the majority of which I know both sexes) has convinced me that *Emplesis* cannot be maintained as a genus apart from *Storeus*.

An extraordinary feature, more or less noticeable in almost all the species, is the apparent doubling of several or all of the joints of the funicle.‡ This apparent doubling is not caused (though usually rendered more pronounced) by dark rings, but by actual constriction of the joints themselves, usually, but not always, in front of the middle. In some species the joints are so strongly constricted that it is actually difficult to tell to which joint a part belongs.

Neither Mr. Pascoe nor Mr. Blackburn have referred to the costæ on the male rostra. These, however, are scarcely noticeable under a Coddington lens, being usually acute and more or less obscured by scales. They are seven in number (sometimes the median or three median ones are almost obsolete), are narrow and acutely raised, and terminate at, just before or just behind, the antennæ. Frequently the median costa is feebly continued to the apex.

The sexual differences in the majority of the species are usually very pronounced. The rostrum of the male is always shorter, and usually much shorter, than that of the female, but is longer than the prothorax,‖ is nearly always much more noticeably costate, is frequently bent only near the apex (arcuate throughout in the female), is usually squamose to the antennæ, instead of at the extreme base only, as in the female, and is always more distinctly punctate in front of the antennæ. The antennæ are stouter in the male, the scape is inserted nearer to the apex of rostrum, and a much greater portion passes the apex. The relative length of the scape to the funicle and club is sometimes different. The club is generally much more elongate in the female than in the male. The metasternum and abdomen of the

* P.L.S., N.S W., 1892, p. 142.

† T.R.S., S.A., p. 150 *et seq.*

‡ This appearance can only be seen under a compound power, and appears to be confined to the males.

‖ With the exception of *L. notata* (Blackburn), which is described as having the rostrum of the male "prothorace paullo breviori."

male are frequently longitudinally depressed, and the depression more or less setose; the females are never depressed there (though occasionally flat), and the scales are but little different in appearance from those at the sides.

As Mr. Blackburn has remarked, in Lacordaire's classification, *Emplesis*, on account of the excavated prosternum, would come out of the *Erirhinides* altogether; but it does not appear to me to be desirable that it should. The only other subfamily to which at present it could be referred is the *Cryptorhynchides*, but from that group it is excluded by two characters in combination (not noticing the partial contiguity of the anterior coxæ, seen to a certain extent in *Melanterius* and a few others). These are the termination of the tibiæ, and the intercoxal process of the mesosternum. In the *Cryptorhynchides* each tibia is almost invariably terminated by a strong curved hook, which appears as a continuation of the tibia itself; whilst in *Emplesis* there is a small subtriangular apical tooth, which can only be regarded as a supplementary process.* The intercoxal process is either plane or convex. In the former case it is usually subquadrate, and slopes down at an angle of about 45°; in the latter it is longer, and almost level with the coxæ. In the *Cryptorhynchides* it appears as a cavernous receptacle for the apex of the rostrum, or in default is turned up at the sides, so as to be more or less concave.

The majority of the species are to be taken under the loose bark of living trees, sometimes in considerable numbers. Of *filirostris* I have seen many thousands of specimens under the bark of an Eucalyptus at Walkaway. A piece of bark four or five inches square would sometimes cover hundreds.

I do not think that the majority of the species can be satisfactorily described without taking into consideration features which are usually considered to be generic. In the tabulation supplied herewith a number of allied species are separated some distance. All of the following in appearance (especially as regards the "tesselation" of the upper-surface) more or less closely resemble each other:—*assimilis*, *mundus*, *gravis*, *filirostris*, *lithostrotus*, *femoralis*, *ignobilis*, *tuberculifrons*, *parvulus*, *impotens*, *brachyderes*, *macrostylus*, *arcuatus*, *ellipticus*, *dispar*, *tessellatus*, *consuetus*, *invidiosus*, *indistinctus*, *mediocris*, and *occidentalis*. Of the others, *canaliculatus*, *cryptorhynchus*, *inamœnus*, *pauperculus*, *epphipiger*, *multiarticulatus*, and *niveiceps* would appear to form a natural group; whilst *bellulus*, *cyphirhinus*,

* Mr. Pascoe describes the tibiæ of *Emplesis* as being "apice inermes." In *filirostris* (of the identification of which I have no doubt whatever) the tibiæ certainly are armed at the apex, but (as in most of the other species) the terminal process is almost entirely concealed by the clothing.

nigrofasciatus, *dorsalis*, and *indistinctus* would appear to form another. *Falsus* and *setosus* are isolated species. *Monticola* in appearance somewhat resembles *majusculus*.

In the species in which I have broken a few specimens for examination (including *variegatus* and *filirostris*) it can be noticed that that portion of the mesothorax which is received into the prothorax has numerous large round, shallow punctures, besides many small ones, which give it a granulate (sometimes transversely granulate) appearance. Each side also is marked by an oblique slightly curved sulcus.

The third and fourth abdominal segments are usually slightly arcuate throughout. They are, however, often drawn (sometimes angularly) rather suddenly backwards at the sides; but there are so many intermediate species that this character cannot be employed other than specifically. I have seen no species in which they are perfectly straight.

I have many species which (as their antennal club is red) I have deferred describing owing to paucity of material. A tabulation of those here described will be found farther on.

STOREUS AMŒNUS, *n. sp.*

Male. Elliptic, moderately robust. Black, tarsi and antennæ dull-red. Head with blackish scales, a feeble line of whitish scales down middle and on each side; a distinct semi-erect, whitish tuft between eyes; rostrum with white scales. Prothorax with black scales, except for a very distinct white patch on each side at the base. Elytra with white scales, intermingled in small patches amongst pale-ochreous ones; a very distinct black fascia just behind the middle, dilating to the sides, and usually (but not always) continued across suture; a few small patches of black scales elsewhere. Legs and under-surface with whitish scales, becoming setose along the middle.

Rostrum rather stout, not much longer than prothorax, moderately strongly curved, subparellel; basal two-thirds with seven fine costæ, of which the median one is most distinct; apical third punctate, and with a very feeble median carina. Antennæ inserted about one-fourth from apex of rostrum; scape distinctly passing apex, shorter than funicle; funicle with first joint as long as second-third, second slightly longer than third, sixth-seventh transverse; club the length of three preceding joints. *Prothorax* transverse, suddenly narrowed in front, sides rounded in middle and feebly decreasing to base, base scarcely bisinuate; not very coarsely punctate, punctures somewhat irregular along middle. *Elytra* wider than prothorax, scarcely parallel to beyond the middle; seriate-punctate, punctures moderately large; interstices feebly convex towards the apex. *Prosternum* deeply and rather widely emarginate in front;

anterior coxæ completely, but at base very narrowly, separated. Intercoxal process of mesosternum subquadrate, flat, densely and finely punctate. Metasternum and abdomen longitudinally depressed, the latter with the third and fourth segments drawn backwards rather angularly at the sides. *Legs* rather robust; femora dentate: the posterior acutely, the intermediate slightly, the anterior scarcely visibly; anterior tibiæ feebly bisinuate beneath. Length, $3\frac{1}{6}$ mm.; rostrum, $\frac{7}{8}$ mm.

Female. Differs in having the rostrum slightly longer, costæ less pronounced, setose instead of squamose, antennæ inserted two-fifths from apex, and the clothing of the body beneath of stouter scales.

Hab.—N.S.W.: Forest Reefs.

A distinct and very pretty species, numerous specimens of which were obtained under bark of the "white" gum.

STOREUS VARIABILIS, *n. sp.*

Male. Elongate-elliptic. Red; sterna, apex of rostrum, and club darker. Head and basal two-thirds of rostrum almost uniformly clothed with whitish flattened scales; on each side of the latter a feeble row of semi-erect scales. Upper-surface with scales varying on different individuals from snowy to pale-ochreous—regular, or almost regular, in tone; rather sparse on prothorax, and usually sparser on elytra, where the pattern appears to be very variable; they are usually denser at the base and apex; frequently there are three feeble transverse fasciæ; sometimes the scales are placed in feeble elongate spots, and in an occasional specimen there is a broad transverse wide fascia just before the middle, and which is continued backwards along the sides. Under-surface and legs with rather sparse scales, usually less pure than on the prothorax.

Rostrum considerably longer than prothorax, gently curved throughout, almost parallel to insertion of antennæ, but then becoming narrower; each side with two moderately distinct costæ; median costa, if present, not traceable; apex punctate. Antennæ elongate, slender; scape inserted about two-fifths from apex of rostrum, about one-third passing apex, very slightly longer than funicle; funicle with first joint as long as second-third combined, and much stouter, second-fourth subcylindrical, second not noticeably longer than third, sixth-seventh subglobular, not transverse; club elongate-ovate, narrow, but considerably wider than funicle, longer than three preceding joints. *Prothorax* longer than wide, apex not suddenly lessened, base distinctly bisinuate; not very distinctly punctate. *Elytra* very feebly dilated behind the shoulders, shoulders rounded; seriate-punctate, punctures shallow, not approximate. *Prosternum* deeply and narrowly grooved. Abdomen with third and fourth segments arcuate throughout.

Legs not very robust; posterior femora distinctly, intermediate slightly dentate, anterior edentate; tibiæ slightly arcuate. Length, $2\frac{1}{2}$ mm.; rostrum, $\frac{3}{4}$ mm.

Female. Differs in having a considerably longer ($1\frac{1}{4}$ mm.) rostrum, with the lateral carinæ very feeble, feebly setose, and (except at extreme base) not at all squamose; the antennæ are inserted almost in middle of rostrum, the scape does not pass the apex, and the sixth-seventh joints of the funicle are scarcely globular.

Hab.—W.A.: Darling Ranges, Swan River, Pinjarrah, Mount Barker.

A distinct but, as regards the clothing, somewhat variable species. I have taken specimens on *Kingia australis*, *Banksia*, and several species of *Eucalyptus*. The second and third joints of the funicle in the male appear each to be double.

STOREUS CONTORTUS, *n. sp.*

Female (?). Moderately elongate. Brownish-red, sterna darker, upper-surface more or less mottled with black. Head uniformly clothed with pale flattened scales, becoming denser between eyes; basal two-thirds of rostrum with sparse setose scales. Prothorax at the sides and base with pale-brown, intermingled with a few whitish scales; scales on elytra in general like those on prothorax, but forming a short longitudinal stripe on each side of scutellum, spots almost forming a fascia beyond the middle and another nearer apex; a distinct triangular black patch on each side, and which do not extend to the suture or sides. Under-surface and legs with whitish scales.

Rostrum the length of prothorax and club combined, arcuate throughout; with seven fine costæ; apical portion punctate, and microscopically punctate. Antennæ elongate, slender, inserted two-fifths from apex of rostrum; scape straight, scarcely thickened towards apex, fully half passing, slightly shorter than funicle and club combined; first joint of funicle almost as long as second-third, second longer than third; club elliptic-ovate, as long as three preceding joints. *Prothorax* scarcely transverse, sides rounded, feebly decreasing to base, and rather more (but not suddenly) to apex; densely punctate. *Elytra* with sides gently arcuate throughout; seriate-punctate, punctures almost concealed. *Prosternum* rather strongly grooved. Abdomen with third and fourth segments gently arcuate. *Legs* moderately robust; femora as in preceding; tibiæ straight. Length, $2\frac{1}{2}$ mm.; rostrum, 1 mm.

Hab.—Swan River.

STOREUS CAPTIOSUS, *n. sp.*

Male. Moderately elongate. Piceous-black, rostrum dark-brown; antennæ, legs, and apex of prothorax red; elytra dark

along suture, dull-red elsewhere. Head closely covered with whitish elongate scales, becoming subfasciculate between eyes; rostrum (except at base) with sparse suberect scales. Upper-surface with white and ochreous scales intermingled, the white scales on the prothorax slightly condensed at the sides and forming two longitudinal stripes (very feebly separated) from the middle of the base; on the elytra forming two scarcely traceable transverse fasciæ; one just beyond the middle, the other between it and apex. Legs and under-surface with white scales.

Rostrum rather stout, slightly longer than prothorax, feebly arcuate; with seven narrow, sharply-raised costæ, partially concealed by clothing; apical third punctate. Antennæ comparatively stout; scape inserted about one-fourth from apex of rostrum, and which it considerably passes, slightly longer than funicle; first joint of funicle longer than second-third, second distinctly longer than third; third-seventh transverse, third shortest of all, its suture with fourth somewhat indistinct; club ovate, almost the length of four preceding joints. *Prothorax* transverse, sides and base gently rounded; densely punctate. *Elytra* with the sides gently rounded; seriate-punctate, punctures rather large and subapproximate. *Prosternal channel* wide and moderately shallow, apex deeply emarginate. Abdomen with third and fourth segments straight, except for a slight angularity at sides. *Legs* moderately stout; posterior femora distinctly, intermediate scarcely, anterior not at all dentate; tibiæ short, feebly bisinuate beneath. Length, $2\frac{1}{2}$ mm.; rostrum, $\frac{2}{3}$ mm.

Female. Differs in having a slightly longer rostrum, setose instead of squamose, and with the carinæ feebly marked, scape inserted one-third from apex of rostrum, &c.

Hab.—Forest Reefs.

Allied to, and on first sight apparently identical with, the preceding, but differs in its clothing, legs, and abdominal sutures.

STOREUS LITHOSTROTUS, *n. sp.*

Male. Elongate-elliptic. Dull-red. Head and rostrum to antennæ densely and almost uniformly clothed with pale-ochreous-white scales. Upper-surface with ochreous and pale-ochreous scales, forming a distinctly tesselated pattern. Under-surface with whitish scales.

Rostrum the length of prothorax and scutellum combined, moderately stout, straight to antennæ, and then bent downwards; costæ sharply raised, but almost concealed by scales; apical half strongly punctate, the interspaces densely and finely punctate. Antennæ rather stout; scape inserted one-fourth from apex of rostrum and more than half passing, as long as funicle and first joint of club combined; funicle with first joint obtriangular, equal to first-third combined, second slightly longer than third,

third-seventh transverse, seventh strongly so; club ovate, the length of four preceding joints, and almost continuous with them. *Prothorax* transverse, apex rather suddenly narrowed, basal three-fourths parallel, base bisinuate; with or without trace of a feeble median line. *Elytra* not parallel-sided, shoulders rounded, apex feebly emarginate; seriate-punctate. *Prosternal channel* rather shallow. Intercoxal process of mesosternum level, or almost level, with coxæ. Abdomen with the third and fourth segments angularly drawn backwards at sides. Length, 3 mm.; rostrum, $\frac{3}{4}$ mm. (female, $1\frac{1}{8}$ mm.).

Female. Differs in having the rostrum longer, thinner, and feebly curved throughout, basal half rather feebly squamose, costæ and apical punctures much feebler. Antennæ slender, scape inserted slightly in front of middle, club elongate-ovate. The anterior femora are thinner and longer.

Hab.—Swan River, Geraldton, Pinjarrah.

STOREUS FEMORALIS, *n. sp.*

Male. Elongate-elliptic. Dull reddish-brown, prothorax and sterna darker. Head closely covered with ochreous-grey scales, denser but not fasciculate between eyes, rostrum closely covered to antennæ. Upper-surface with ochreous scales, forming a feeble tesselated pattern; elytra in addition with fine lines of decumbent setæ. Under-surface and legs with whitish or pale-ochreous scales.

Rostrum elongate, rather strongly curved; with sharply raised and slightly waved costæ, which become very feeble in front of antennæ; apical portion subrugosely punctate. Antennæ comparatively stout; scape inserted about one-third from apex of rostrum, not one-third passing apex, almost the length of funicle and club; first joint of funicle equal to second-third, second considerably longer than third, fourth-seventh transverse; club briefly ovate, the length of three preceding joints. *Prothorax* strongly transverse, apex rather suddenly narrowed, sides rounded and decreasing to base; densely punctate. *Elytra* feebly emarginate at apex; seriate-punctate, lightly striate, punctures rather large. *Prosternal channel* not very deep or wide; coxæ just touching at their bases. Intercoxal process of mesosternum raised and almost globular. Metasternum and abdomen somewhat concave; third and fourth segments of the latter rather strongly drawn backwards at sides. Length, $3\frac{1}{2}$ mm.; rostrum, 1 mm. (female, $1\frac{1}{2}$ mm.).

Female. Differs in having the rostrum considerably longer, less squamose (though more densely so than is usual in the sex), the costæ much less distinct, apical portion with elongate shallow punctures. Antennæ slender, club rather elongate,

almost continuous with funicle; body beneath not concave, and the anterior femora thinner.

Hab.—N.W.A.: Upper Ord River (Mr. R. Helms).

An abundant species. The four posterior femora are distinctly grooved. In many other species, however, they are grooved, but the grooves are almost concealed. The second and third joints of the funicle in the male are each divided into two unequal portions, of which the anterior is much shorter, and is distinctly considerably narrower than the posterior, the sutures are dark-brown, and the funicle even on a close inspection appears to be nine-jointed.

STOREUS IGNOBILIS, *n. sp.*

Male. Elliptic, moderately elongate. Dull-reddish-brown; antennæ, legs, and three apical segments of abdomen somewhat paler. Head rather closely covered with whitish scales, dense between eyes; rostrum moderately densely clothed at base, but decreasing towards and terminating before antennæ. Scales on body much as in the preceding, but the tesselated pattern still less distinct, and the elytra without lines of setæ.

Rostrum the length of prothorax and scutellum combined, moderately stout, bent at insertion of antennæ; with seven sharply raised costæ, all of which are distinct; apical portion, especially just in front of antennæ, strongly punctate, the interspaces finely punctate. Antennæ rather slender; scape inserted one-third from apex of rostrum, about half passing apex, slightly shorter than funicle and club; first joint of funicle a little longer than second-third combined; club ovate, moderately elongate, almost equal in length to four preceding joints. *Prothorax* strongly transverse, apex rather suddenly narrowed, basal two-thirds subparallel, base bisinuate; densely punctate. *Elytra* scarcely emarginate at apex; seriate-punctate, towards apex lightly striate. *Prosternal channel* rather deep and wide. Intercoxal process of mesosternum rather elongate and level with coxæ. Abdomen with third and fourth segments straight, except for a slight angularity at the sides. Length, $3\frac{1}{3}$ mm.; rostrum, 1 mm.

Hab.—N.S.W.: Tamworth.

STOREUS TUBERCULIFRONS, *n. sp.*

Elongate-elliptic. Dull-reddish-brown, rostrum (except apex) and antennæ paler. Head densely clothed with ochreous-brown scales, between the eyes two fasciculate tubercles. Rostrum densely clothed from base to very near apex, denser between antennæ than elsewhere, scales paler than on head, behind the antennæ the scales are directed backwards, in front of them they are directed forwards. Upper-surface densely clothed with dark

ochreous scales, on the prothorax a short black stripe on each side of base, on the elytra with short feeble stripes about the middle, and dark-brown scales commencing on the suture near the base, and forming a moderately large and very irregular sutural patch, which terminates beyond the middle, sides with a few small subquadrate patches of brown scales; scutellum with whitish scales. Under-surface and legs moderately densely clothed with pale-ochreous scales.

Rostrum filiform, feebly curved throughout, almost twice the length of prothorax; apical portion densely punctate, interspaces densely and finely punctate. Antennæ rather stout; scape inserted nearer base than apex, terminating considerably before apex, the length of funicle; first joint of funicle the length of second-fourth, second almost twice the length of third, seventh transverse; club elongate-ovate, not much wider than funicle, and scarcely longer than three preceding joints. *Prothorax* strongly transverse, somewhat flat, sides gently rounded, apex rather suddenly narrowed and rather less produced than usual. *Elytra* lightly marginate at apex; seriate-punctate, lightly striate. *Prosternal channel* rather feeble, apex deeply emarginate. Abdomen with third and fourth segments lightly arcuate at sides. Length, $2\frac{3}{4}$ mm.; rostrum, $1\frac{1}{3}$ mm.

Hab.—N.W.A.: Upper Ord River (Mr. R. Helms)

I have seen but one specimen of this extraordinary species, and am very doubtful as to its sex. The clothing of the rostrum appears to be incompatible with a female, but on the other hand the insertion of the antennæ, length of club, clothing of joints of funicle (scales not elongate setæ), apparent absence of costæ, except at the sides of rostrum (the clothing, however, prevents me from being certain on this point) are all apparently feminine. On the whole, therefore, I believe the specimen to be a female. The fascicles between the eyes are very distinct, and are conjoined at their bases; each is supported on a rounded, distinctly elevated tubercle (I have removed one of the fascicles to be sure of this point). The whole strongly reminds one of the head of many of the species of *Ethemaia* and *Rhinaria*. The scales on the elytra can scarcely be said to form a tesselated pattern.

In this and all the following species the intercoxal process of the mesosternum is depressed and slopes downward, usually at an angle of about 45°.

STOREUS PARVULUS, *n. sp.*

Female (?). Elongate-ovate. Red, under darker than upper-surface, antennæ paler than rostrum. Head moderately clothed with pale-ochreous scales, paler and suberect between eyes and extreme base of rostrum; rostrum elsewhere with fine whitish scales. Prothorax with white and ochreous scales, elytra with

similar but sparser scales, the white ones more condensed beyond the middle, beyond which on the suture two small and moderately distinct spots are formed ; in addition to the scales with short stout, suberect setæ, moderately distinct when viewed from the sides.

Rostrum moderately stout, feebly curved, very slightly longer than prothorax, slightly enlarged at base ; sides distinctly costate, median costæ scarcely visible ; apical portion moderately punctate. Antennæ rather stout ; scape inserted two-fifths from apex of rostrum, not one-fourth passing apex, no longer than funicle ; first joint of funicle the length of second-fourth, second twice as long as third, third-seventh transverse ; club briefly ovate, considerably wider than funicle, the length of four preceding joints. *Prothorax* transverse, apex not much narrower than base, sides gently rounded. *Elytra* subparallel to near apex ; striate-punctate, punctures moderately large, interstices feebly convex. *Prosternal channel* not very deep or wide. Abdomen with third and fourth segments very feebly curved at sides. Length, $1\frac{7}{8}$ mm.; rostrum, $\frac{1}{2}$ mm.

Hab.—N.S.W.: Windsor.

A pretty species below the average size. The specimen under examination is probably a female, but as the elytra have suberect setæ in addition to the scales, I have felt no hesitation to describe it.

STOREUS FALSUS, *n. sp.*

Male. Comparatively wide. Brownish-red, prothorax darker, club piceous. Head with blackish scales ; rostrum with sparse setose scales from base to antennæ, thence to apex with very fine setæ. Prothorax with blackish-brown scales, a feeble stripe of ochreous scales on each side of base, and a few scattered singly about apex ; scutellum with whitish scales ; elytra with ochreous and dark-brown scales, the former forming a short stripe on each side (distant two interstices) of suture, with a very feeble and much interrupted fascia of whitish scales beyond the middle ; towards the apex with feeble rows of short, stout, suberect, whitish setæ. Under-surface with pale-ochreous scales, except along each side of middle ; legs with brown scales, the femora in addition with ochreous ones ; apical third of tibiæ fringed beneath with long thin hair.

Rostrum long and thin, bent at insertion of antennæ ; three median costæ present, but ill-defined, the others acute ; apex rather finely punctate. Antennæ slender ; scape inserted one-fourth from apex of rostrum, two-thirds passing apex, the length of funicle and club ; first joint of funicle as long as second-third, second longer than third, seventh not transverse ; club elongate, less than four preceding joints. *Prothorax* strongly

transverse, very strongly and suddenly narrowed in front, base bisinuate; densely punctate. *Elytra* elongate-cordate, shoulders strongly rounded; seriate-punctate, punctures not very large; interstices punctate and somewhat irregular; a slight preapical callus on each side. *Prosternal channel* wide, and not deep. Metasternum and abdomen with a very distinct longitudinal depression; the third and fourth segments of the latter strongly and angularly drawn backwards at the sides. *Legs* longer than usual; femora distinctly grooved. Length, 4 mm.; rostrum, $1\frac{1}{2}$ mm.

Hab.—N.S.W.: Shoalhaven (Mr. J. P. Hill).

A very distinct species, at first sight apparently foreign to the genus; but the antennæ, rostrum, prosternal channel, and abdomen leave no doubt in my mind but that it is correctly placed. The false doubling of the joints of the funicle is very distinct in the second fourth joints, and less so, but still distinct, in the others; it is, perhaps, more pronounced than in any other species of the genus.

STOREUS CANALICULATUS, *n. sp.*

Male. Ovate. Red, sterna and elytral suture darker, club black. Head rather closely covered with pale-ochreous-white scales; rostrum to antennæ with sparser, whiter, and semi-erect scales; apical portion very feebly setose. Upper and under-surface clothed with pale, almost white, scales rather loosely applied, and in addition with short suberect setæ.

Rostrum longer than prothorax and scutellum, straight, except that at antennæ it is slightly turned down; moderately acutely costate; apical portion moderately strongly punctate, the punctures subseriately arranged. Antennæ moderately slender; scape inserted two-sevenths from apex of rostrum, fully half passing apex, as long as funicle and two basal joints of club; first joint of funicle longer than second-third, second equal to third-fourth, seventh feebly transverse; club elongate-ovate, equal to four preceding joints. *Prothorax* subconical, apex considerably narrower than base, but not suddenly lessened. *Elytra* cordate, apex conjointly rounded; seriate-punctate. *Prosternal channel* rather deep and distinct. Abdomen with the third and fourth segments lightly arcuate. Length, $1\frac{3}{4}$ mm.; rostrum, $\frac{1}{2}$ mm.

Hab.—N.S.W.: Dalmorton.

I have a specimen, which appears to be the female of this species, from the Tweed River. It differs in having the rostrum longer ($\frac{3}{4}$ mm.), median costæ not traceable, basal half with sparse setose scales, apical portion finely punctate; the antennæ slender, scape inserted four-ninths from apex, which it scarcely passes, and the club more elongate.

STOREUS SETOSUS, *n. sp.*

Male. Elongate-elliptic. Red, metasternum and club black. Head moderately clothed with flat, pale, yellowish-white scales, more rounded than is usual; between the eyes the scales are denser and suberect, and from there to the antennæ they become narrower and sparser. Closely covered with white (in some specimens very pale-ochreous) glistening scales (in several specimens there is a trace of a feeble pale-ochreous fascia near the base of the elytra, but the scales are nearly always uniform in colour), with lines of very distinct, stout, white, almost erect setæ, which are directed backwards on the elytra, and forwards on the prothorax. Under-surface with white scales, becoming setose along the middle.

Rostrum slender, considerably longer than prothorax, feebly bent throughout; median costa unmarked; apical portion moderately strongly punctate. Antennæ rather slender; scape inserted two-fifths from apex of rostrum, scarcely one-third passing, slightly longer than funicle; first joint of funicle slightly longer than second-third, second distinctly longer than third, second-fourth feebly doubled, seventh feebly transverse; club ovate. *Prothorax* as long as wide, apex slightly narrower than base, and not suddenly lessened. *Elytra* elongate-cordate, apex conjointly rounded; seriate-punctate. *Prosternal channel* distinct, anterior coxæ rather widely separated. Abdomen with third and fourth segments rather strongly but scarcely angularly drawn backwards at sides. *Legs* rather long; claw joint of anterior tarsi exserted fully as far as the others. Length, 2 mm.; rostrum, $\frac{3}{4}$ mm. (female, $1\frac{1}{4}$ mm.).

Female. Differs in having the rostrum longer, thinner, squamose at base only, lateral costæ very feebly defined; the antennæ thinner, scape inserted almost in middle of rostrum, and not extending to apex, and the club elongate-ovate. The scales beneath are less setose along the middle than in the male.

Hab.—W.A.: Geraldton.

A very distinct species, slightly variable as regards the clothing of the elytra.

STOREUS CRYPTORHYNCHUS, *n. sp.*

Male. Elliptic-ovate. Brownish-red, sterna darker, club piceous. Head and base of rostrum with adpressed white scales, rather more condensed between the eyes than elsewhere. Upper-surface with dark-greyish scales, intermingled with long, almost erect setæ; scales of metasternum and abdomen paler.

Rostrum the length of prothorax and scutellum combined, moderately curved throughout; indistinctly costate; apical portion rather sparsely punctate. Antennæ moderate; scape

inserted two-fifths from apex of rostrum, not half passing, the length of funicle; funicle with first joint stout, slightly longer than second-third combined, second longer than third, seventh transversely triangular; club ovate, about the length of four preceding joints, considerably wider than seventh. *Prothorax* scarcely transverse, apex not much narrower than base, and not suddenly narrowed. ocular lobes not prominent, base bisinuate; densely punctate. *Elytra* elongate-cordate, apex lightly emarginate; seriate-punctate, feebly striate. *Prosternal channel* very distinct, coxæ moderately widely separated. Abdomen with third and fourth segments distinctly angular at sides. *Legs* comparatively long. Length, 2 mm.; rostrum, $\frac{2}{3}$ mm. (female, 1 mm.).

Female. Differs in having a longer and entirely glabrous rostrum, scape inserted slightly in advance of middle, and shorter than funicle; the club is also a trifle longer.

Hab.—Sydney.

A small and abundant species, at first sight appearing to belong to the *Cryptorhynchides*, and resembling some of the species of *Acalles*. The rostrum of the female appears to be much redder than the prothorax, but this is entirely due to its absence of clothing.

STOREUS INAMŒNUS, *n. sp.*

Closely resembles the preceding species, but differs in being considerably larger ($2\frac{1}{2}$ mm.); setæ stouter, more erect, and much more distinct; rostrum acutely costate (the three median ones, however, slightly less distinct than the others), apical portion more coarsely punctate; scape rather longer in proportion to funicle; of the latter the second-fourth joints apparently double (there is no trace of this in the preceding); the third and fourth abdominal segments are less distinctly produced backwards at the sides, and the rostrum of the male is longer and thinner.

Hab.—N.S.W.: Clarence River.

Seven specimens, obtained in flood debris.

STOREUS BELLULUS, *n. sp.*

Male. Ovate. Piceous black, elytra red, except for a sutural stripe (terminating before apex) of piceous; rostrum, antennæ (club excepted), and legs reddish. Head moderately closely covered with whitish scales, rostrum with suberect scales, moderately dense at base, becoming sparser and finer towards, and terminating just before, antennæ; a few whitish setæ in front. Prothorax with patches of snowy scales on each side of base and apex, and forming two feeble stripes in middle of base; elytra with dark scales along suture to beyond the middle, except for three transverse white fasciæ—one near base, one

median, and one subapical; sides and apex with numerous small patches of white scales. Under-surface and legs with rather sparse white scales.

Rostrum filiform, arcuate throughout, longer than prothorax and scutellum combined; acutely costate, the three median slightly feebler than the lateral costæ; apical portion (especially just in front of antennæ) coarsely punctate. Antennæ rather slender; scape inserted two-fifths from apex of rostrum, half passing, the length of funicle and two basal joints of club; funicle with first joint the length of second-fourth, these feebly doubled, second almost twice the length of third, sixth-seventh transverse; club elongate-ovate, the length of four preceding joints. *Prothorax* scarcely transverse, apex considerably narrower than base, but not suddenly lessened, base feebly bisinuate; densely punctate. *Elytra* oblong-cordate, shoulders feebly rounded, apex conjointly rounded; seriate punctate, sides lightly striate. *Prosternal channel* deep and moderately wide. Abdomen with third and fourth sutures somewhat angularly produced backwards at sides. *Legs* moderately long, claw joint of anterior tarsi more strongly exserted than usual. Length, $2\frac{1}{4}$ mm.; rostrum, 1 (vix) mm.

Hab.—W.A.: Swan River, Mount Barker.

Three specimens, all males.

STOREUS IMPOTENS, *n. sp.*

Male. Elliptic. Red; meso-, metasternum, and the club piceous-black. Head and rostrum to antennæ closely covered with whitish scales, denser between eyes than elsewhere; apex of rostrum with whitish setæ. Clothed with pale-ochreous scales, on the upper-surface forming a distinct tesselated pattern.

Rostrum moderately stout, the length of prothorax and scutellum, straight to antennæ, and there feebly bent downwards; slightly dilated between base and antennæ, with sharply raised costæ, of which the median one is less noticeable than those adjoining it, the costæ feebly continued beyond antennæ; apical portion strongly punctate. Antennæ moderately stout; scape inserted one-third from apex of rostrum, about half passing, the length of funicle and club combined; funicle with first joint the length of second-fourth, second almost as long as third-fourth, fourth-seventh transverse; club ovate, equal to four preceding joints. *Prothorax* almost as long as wide, apex not suddenly narrowed; densely punctate. *Elytra* elongate-cordate, apex conjointly rounded; seriate-punctate, punctures subquadrate, lightly striate. *Prosternal channel* rather feeble, apex feebly emarginate. Abdomen with third and fourth segments feebly arcuate. Length, $2\frac{1}{8}$ mm.; width, $\frac{2}{3}$ mm.

Hab.—Sydney.

Two male specimens under examination.

STOREUS BRACHYDERES, *n. sp.*

Male. Elongate-elliptic. Dark-red, under-surface and club piceous. Head densely clothed with ochreous, pale brown, and blackish scales; scales denser, paler, and almost erect between eyes; rostrum moderately densely clothed with suberect pale scales. Upper-surface with ochreous and ochreous-grey scales, forming a moderately distinct tesselated pattern. Under-surface and legs with whitish scales.

Rostrum slightly longer than prothorax and scutellum combined, almost straight to antennæ, and then bent downwards, subparallel to near apex; with acutely raised costæ not passing antennæ; apex coarsely punctate. Antennæ elongate; scape inserted one-fourth from apex of rostrum, and considerably passing apex, longer than funicle; first joint of funicle slightly longer than second-third, second distinctly longer than third, seventh transverse; club elongate-ovate, the length of four preceding joints. *Prothorax* strongly transverse, apex considerably narrower than base, and rather suddenly lessened, base feebly bisinuate; densely punctate. *Elytra* elongate-cordate, apex feebly emarginate, shoulders strongly rounded; seriate punctate, lightly striate. *Prosternal channel* distinct, apex deeply emarginate, separation of anterior coxæ distinct. Metasternum and abdomen moderately depressed along middle, the latter with third and fourth segments rather strongly angular at sides. *Legs* rather longer than usual. Length, $3\frac{1}{4}$ mm.; rostrum, 1 mm. (female, $1\frac{1}{2}$ mm.).

Female. Differs in having the rostrum rather strongly arcuate, considerably longer, feebly costate, squamose at base only, very finely setose elsewhere, and very finely punctate towards apex; the scape is inserted not much nearer apex than base of rostrum, and does not extend to apex.

Hab.—N.S.W.: Tamworth, Forest Reefs (Lea); V.: Benalla (Mr. R. Helms).

A comparatively large species, more widely distributed than usual.

STOREUS CYPHIRHINUS, *n. sp.*

Female. Elliptic. Brownish-red, under-surface (except apical segment of abdomen) and club piceous-black. Head moderately densely clothed with snowy-white scales, denser and suberect (but scarcely fasciculate) between eyes; rostrum squamose only at extreme base. Clothed with greyish-white scales, which on the upper-surface are rather irregularly distributed, but scarcely form spots or fasciæ.

Rostrum filiform, arcuate, longer than prothorax and scutellum combined; lateral costæ well defined, the others represented by feeble undulations; apical portion with elongate and rather

sparse punctures, intermingled with minute ones; scarcely noticeably incurved between antennæ and apex. Antennæ slender; scape inserted slightly nearer apex than base, the length of funicle and first joint of club; first joint of funicle the length of second-fourth, seventh transverse; club ovate, moderately elongate, shorter than the four preceding joints. *Prothorax* moderately transverse, apex not suddenly narrowed, sides gently rounded; densely punctate. *Elytra* elongate- (almost oblong-) cordate, apex very feebly emarginate; seriate-punctate, punctures rather large and subquadrate, lightly striate. *Prosternal channel* rather distinct, apex deeply emarginate, separation of coxæ distinct. Abdomen with third and fourth segments lightly arcuate throughout. Length, $2\frac{2}{3}$ mm.; rostrum, 1 mm.

Hab.—Forest Reefs.

As the club of the antennæ is black, I have not hesitated to describe this species, although possessing but two females.

STOREUS PAUPERCULUS, *n. sp.*

Male. Elliptic-ovate. Red, metasternum scarcely darker, club black. Head moderately clothed with whitish scales, becoming paler and suberect between eyes and on rostrum; on the latter becoming sparser towards and terminating just before antennæ, a few white setæ towards apex. Clothed with greyish or pale-ochreous scales, having on the upper-surface a very feeble spotted appearance; the elytra in addition with lines of stout yellowish setæ—not visible from the sides.

Rostrum the length of prothorax and scutellum combined, gently curved throughout; acutely costate at sides, median costa not traceable; apex finely punctate. Antennæ moderately slender; scape inserted about one-fourth from apex of rostrum, more than half passing, a little shorter than funicle and club combined; first joint of funicle the length of second-fourth, second equal to third-fourth, seventh rather strongly transverse; club ovate, shorter than four preceding joints. *Prothorax* scarcely transverse, apex not much narrower than base, ocular lobes feeble; densely punctate. *Elytra* oblong-cordate, shoulders feebly rounded; apex scarcely emarginate; seriate-punctate, punctures scarcely traceable. *Prosternal channel* distinct, apex deeply emarginate. Abdomen with third and fourth segments very feebly arcuate throughout. Length, 2 (vix) mm.; rostrum, $\frac{2}{3}$ mm.

Hab.—W.A.: Albany.

The curvature of the third and fourth abdominal segments is less than in any other species with which I am acquainted.

STOREUS NIGROFASCIATUS, *n. sp.*

Male. Ovate. Dull-red, rostrum and metasternum somewhat darker, prothorax brown. Head with rather dense white scales,

which are large, but scarcely as dense between eyes as on vertex; rostrum rather sparsely squamose, the scales terminating before antennæ. Prothorax with pale-ochreous (almost white) scales, forming eight (including the extreme lateral ones) feeble lines; elytra with slightly darker scales, not very evenly distributed, and with a transverse, complete (except that it is not continued to the extreme outer margins) black, somewhat irregular and wide fascia beyond the middle. Under-surface with rather sparse whitish scales.

Rostrum moderately curved throughout, the length of prothorax and scutellum combined; with sharply raised costæ, of which those on each side of the median one are feebler than the others, the median continued to, but very feeble towards, apex; apical portion, especially near antennæ, coarsely punctate. Antennæ rather slender; scape inserted one-fourth from apex of rostrum, fully half passing, the length of funicle and first joint of club; funicle with all the joints apparently doubled, but only the second-fourth distinctly so, first equal to second-third, second longer than third, seventh slightly transverse; club ovate, rather elongate. *Prothorax* transverse, sides rounded, apex not much narrower than base; densely and coarsely punctate. *Elytra* suboblong-cordate, shoulders lightly rounded; apex feebly emarginate; seriate-punctate, punctures rather large and subquadrate, lightly striate. *Prosternal channel* distinct, apex deeply emarginate. Metasternum and abdomen with a feeble depression, third and fourth segments of the latter feebly angular at sides. *Legs* rather long; femora grooved; tibiæ feebly bisinuate beneath; claw joint of anterior tarsi rather strongly exserted. Length, $2\frac{2}{3}$ mm.; rostrum, 1 mm.

Hab.—Forest Reefs.

A very distinct and comparatively robust species.

Storeus macrostylus, *n. sp.*

Male. Elongate-elliptic. Dull-red, metasternum slightly darker. Head moderately clothed with narrow scales, denser between and erect at sides of eyes; rostrum squamose its entire length, but the scales near apex sparser and subsetose. Upper-surface with pale-ochreous scales arranged on the prothorax in very feeble lines, the elytra with whitish scales forming feeble elongated spots, and appearing to form a very feeble fascia about the middle, the whole having a slightly tesselated appearance. Under-surface and legs with sparse whitish scales.

Rostrum almost straight, longer than prothorax and scutellum combined; with sharply raised costæ, the median one indistinct, except near apex. Antennæ moderately slender; scape inserted two-sevenths from apex of rostrum, more than half passing, the

length of funicle and club combined; funicle with first joint slightly longer than second-third, second doubled and longer than third, seventh not transverse; club ovate, moderately long, shorter than four preceding joints. *Prothorax* transverse, apex less produced than usual, considerably narrower (though not suddenly lessened) than base, basal two-thirds subparallel, base bisinuate; densely punctate. *Elytra* elliptic-cordate, apex rather distinctly emarginate; seriate-punctate, punctures moderately large and subquadrate, lightly striate. *Prosternal channel* feeble, apex feebly emarginate. Metasternum and abdomen feebly depressed along middle, third and fourth segments of the latter feebly angular at sides. Length, 3 mm.; rostrum, $1\frac{1}{8}$ mm.

Hab.—W.A.: Bridgetown.

STOREUS ARCUATUS, *n. sp.*

Male. Elongate-ovate. Red, elytra with two piceous markings—one an almost circular blotch extending from near the base to the middle, the other a moderately wide semicircle, commencing near each side just beyond the middle. Head not very closely covered with whitish scales, becoming subfasciculate between eyes; rostrum with semierect seriate scales, which terminate just before antennæ. Upper-surface with pale-ochreous or griseous scales, which form feeble lines on the prothorax, and feeble spots on the elytra; on the latter they distinctly margin the dark basal blotch. Under-surface with sparse whitish scales.

Rostrum feebly curved, distinctly longer than prothorax and scutellum combined; with acutely raised subequal costæ, terminating either level with or just before antennæ; apical portion coarsely punctate. Antennæ slender; scape inserted two-sevenths from apex of rostrum, more than half passing, the length of funicle and club; first joint of funicle equal to second-third, seventh feebly transverse; club elliptic, the length of four preceding joints. *Prothorax* strongly transverse, sides rounded, apex very feebly produced, and not much narrower than base. *Elytra* scarcely emarginate at apex; striate-punctate, punctures rather large and subquadrate; interstices convex. *Prosternal channel* scarcely defined, apex widely and very feebly emarginate. Abdomen with third and fourth segments feebly angular at sides. *Legs* moderately long; anterior tibiæ moderately curved *throughout*. Length, $3\frac{1}{2}$ mm.; rostrum, $1\frac{1}{4}$ mm.

Hab.—W.A.: Swan River, Beverley.

The prosternal channel is scarcely as well defined as it is in *S. variegatus*.

STOREUS ELLIPTICUS, *n. sp.*

Male. Elliptic. Dull-red. Head moderately densely (denser between eyes than elsewhere) clothed with whitish scales; rostrum moderately densely and almost equally clothed from near base almost to antennæ. Upper-surface rather densely clothed with muddy brown and ochreous-grey scales, giving the elytra a feebly tesselated appearance. Under-surface with sparse dingy-whitish scales.

Rostrum almost straight, slightly longer than prothorax; acutely costate, costæ almost concealed; apical portion rather coarsely punctate, interspaces densely and finely punctate. Antennæ rather slender; scape inserted one-fourth from apex of rostrum, two-thirds passing, slightly shorter than funicle and club combined; funicle with second-seventh joints apparently doubled, first longer than second-third, second almost twice the length of third, seventh feebly transverse; club elongate-ovate, equal to four preceding joints. *Prothorax* transverse, apex rather suddenly narrowed; densely punctate. *Elytra* elongate-cordate, apex scarcely emarginate; punctures rather feeble and elongate, scarcely traceable unless scales are removed. *Prosternal channel* feeble. Abdomen with third and fourth segments feebly angular at sides. Anterior *tibiæ* very feebly bisinuate beneath. Length, $2\frac{1}{2}$ mm.; rostrum, $\frac{3}{4}$ mm.

Hab.—Swan River.

STOREUS DISPAR, *n. sp.*

Male. Elongate-elliptic. Red, metasternum darker, elytral suture narrowly tinged with piceous. Head and base of rostrum densely clothed with ochreous-white scales; rostrum from near base to middle with the scales arranged in lines, elsewhere non-squamose. Upper-surface clothed with pale-ochreous and whitish scales, giving it a distinctly tesselated appearance; the elytra with a transverse brown patch about summit of posterior declivity. Under-surface with whitish scales.

Rostrum thin, almost straight, longer than prothorax and scutellum combined; with seven acutely raised costæ, which, except the extreme lateral ones, terminate just before antennæ; apical portion (especially between antennæ) rather coarsely punctate. Antennæ slender; scape inserted one-third from apex of rostrum, rather more than half passing, slightly longer than funicle and club combined; funicle with all the joints apparently feebly doubled, first almost the length of second-fourth, second almost the length of third-fourth, seventh transversely triangular; club ovate. *Prothorax* slightly longer than wide, apex rather suddenly narrowed, ocular lobes acute. *Elytra* elongate- or oblong-cordate, apex rather strongly (for the genus) emarginate;

seriate-punctate, towards the apex lightly striate. *Prosternal channel* distinct, apex deeply emarginate, coxæ feebly separated. Abdomen with third and fourth segments feebly arcuate at sides. *Legs* long; tibiæ almost straight. Length, $3\frac{1}{2}$ mm.; rostrum, $1\frac{1}{4}$ mm, (female, 2 mm.).

Female. Differs in having the rostrum thinner, fully twice the length of prothorax, almost perfectly cylindrical, squamose at base only, only the lateral costæ traceable, and even straighter than in the male; the scape is inserted distinctly nearer base than apex of rostrum, scarcely extends to eye, and terminates considerably before apex of rostrum; the club is scarcely longer than in the male.

Hab.—Swan River.

The insertion of the scape in the female is much as in *filirostris* and a few others, but rather nearer the base. In most of the specimens under examination the outer ring of facets of the eyes are distinctly ochreous; this appearance is doubtless accidental, as in specimens of several other species a similar appearance is seen.

STOREUS TESSELLATUS, *n. sp.*

Male. Elongate-elliptic. Dull-red. Head densely clothed with whitish scales, not much denser between eyes than elsewhere: rostrum less densely clothed to antennæ, in front with sparse whitish setæ. Upper-surface with pale-ochreous and whitish scales, the elytra with a number of dark subquadrate spots (four on the third interstice), the whole having a very distinctly tesselated appearance. Under-surface with ochreous-white scales.

Rostrum moderately stout, lightly curved, scarcely longer than prothorax; with sharply raised costa, of which the median one is almost as strong as the others, but all more or less concealed by clothing; apical portion densely and irregularly punctate. Antennæ moderate; scape inserted one-third from apex of rostrum, about half passing, shorter than funicle and club combined; first joint of funicle equal to second-fourth, second slightly longer than third, seventh not transverse; club briefly ovate, no longer than three preceding joints combined. *Prothorax* transverse, apex feebly but rather suddenly narrowed. *Elytra* elongate-cordate, shoulders rather strongly rounded; seriate-punctate, lightly striate throughout. *Prosternal channel* distinct, apex deeply emarginate. Abdomen with third and fourth segments somewhat angular at sides. Length, $2\frac{1}{3}$ mm.; rostrum, $\frac{3}{4}$ mm. (female, 1 mm.).

Female. Differs in having a longer and more noticeably curved rostrum, squamose only at base, the costæ irregular and but feebly traceable, antennæ thinner, scape inserted three-

sevenths from apex of rostrum, and just passing, and the club elongate-ovate.

Hab.—Forest Reefs.

STOREUS EPPHIPIGER, *n. sp.*

Male. Briefly ovate. Dark-red, rostrum and antennæ paler; elytra stained with piceous, except near base; metasternum piceous. Head moderately clothed with yellowish adpressed scales, denser between eyes than elsewhere, and feebly continued along sides of rostrum. Upper-surface with dingy-greyish or ochreous scales, sparsely and rather evenly distributed: elytra with a very distinct subquadrate patch of white scales, which commences about the middle, and is continued below summit of posterior declivity. Under-surface with sparse whitish scales, legs rather more densely clothed.

Rostrum moderately strongly curved throughout, slightly longer than prothorax, very feebly incurved to middle; with traces of feeble costæ, which are marked by five elongate punctures, and separated by rows of moderately strong ones; apical portion rather strongly punctate. Antennæ rather stout; scape inserted two-fifths from apex of rostrum, not one-third passing, the length of funicle; first joint of the latter the length of second-fourth, second almost as long as third-fourth, sixth-seventh transverse; club ovate, almost the length of four preceding joints. *Prothorax* feebly transverse, sides almost equally rounded, apex not much narrower than base, base almost straight. *Elytra* cordate, apex scarcely emarginate; seriate-punctate, punctures moderately large and subquadrate. *Prosternal channel* distinct, apex moderately emarginate. Abdomen with third and fourth segments feebly arcuate throughout. *Legs* moderately long; tibiæ feebly bisinuate beneath. Length, 2 mm.; rostrum, $\frac{2}{3}$ mm.

Hab.—W.A.: Geraldton.

The first and second joints of the funicle are distinctly doubled, and there is a faint trace of doubling in the third-fourth; the rostral costæ are little more than feeble ridges, and had my specimens (four) been judged by this character they would probably have been considered as females.

STOREUS MULTIARTICULATUS, *n. sp.*

Male. Shape, colour, and size much as in preceding. Scales much as in preceding, except that they are rather less evenly distributed, and that the elytra are without a distinct patch.

Rostrum comparatively stout; with seven rather feeble costæ, of which the median one is scarcely traceable, very feebly diminishing in width from base to apex; apical half moderately

strongly punctate. Antennæ moderately stout; scape inserted two-fifths from apex of rostrum, little more than clubbed portion passing apex, shorter than funicle; funicle with all the joints, except the first and seventh, apparently doubled. All else, except that the third and fourth abdominal segments are more angular at the sides, as in the preceding. Length, $2\frac{1}{8}$ mm.; rostrum, $\frac{2}{3}$ mm.

Female. Differs in having the head and rostrum less squamose, the latter with much feebler costæ; antennæ thinner, inserted a little further (though not much) from the apex; funicle simple, and the club more elongate and almost elliptic.

Hab.—Geraldton.

Numerous specimens obtained under bark of *Melaleuca*, sp.

STOREUS NIVEICEPS, *n. sp.*

Male. Elongate-ovate. Dark-red, rostrum and antennæ paler. Head (more densely between eyes than elsewhere) and basal half of rostrum with moderately dense snowy-white scales, rest of rostrum with sparse white setæ. Scales of upper surface (beneath they are purer) of an almost uniform dirty-white.

Rostrum lightly curved, the length of prothorax and scutellum combined; costæ distinct at sides, feeble in middle, median costa feebly longitudinally divided; apical portion moderately strongly punctate. Antennæ moderately slender; scape inserted two-fifths from apex of rostrum, not half passing, the length of funicle and first joint of club; first joint of funicle equal to second-fourth, second equal to third-fourth, seventh scarcely transverse; club ovate, equal to four preceding joints, considerably wider than funicle. *Prothorax* almost quadrate, the sides being very lightly rounded, and the apex almost the exact width of base. *Elytra* elongate-cordate, apex conjointly rounded; striate-punctate, striæ very feeble, punctures almost concealed by clothing. *Prosternal channel* distinct, apex more deeply emarginate than usual, anterior coxæ rather widely separated. Abdomen with third and fourth segments comparatively strongly arcuate throughout. Length, $1\frac{3}{4}$ mm.; rostrum, $\frac{1}{2}$ mm. (female, $\frac{3}{4}$ mm.).

Female. Differs in having the rostrum longer, more noticeably curved, thinner, costæ feebler at sides and absent in middle, feebly squamose at sides, and apical portion rather sparsely punctate; the scape is inserted slightly in advance of the middle of rostrum, and not one-fourth passes apex, and the club is slightly longer.

Hab.—N.S.W.: Gosford, Loftus, Galston, Sydney.

A small soberly-coloured species, on first sight appearing to belong to the *Cryptorhynchides*. At Gosford numerous specimens were beaten from a species of *Melaleuca*.

STOREUS DORSALIS, *n. sp.*

Male. Elliptic-ovate. Piceous-black, apex of prothorax, sides of elytra, apex of abdomen, legs, rostrum, and antennæ reddish. Head moderately clothed with dingy-whitish scales, dense between eyes; rostrum rather sparsely squamose at extreme base, and with fine white setæ from near base to antennæ. Prothorax with a large dorsal patch of blackish scales, the margins with two feeble stripes of ochreous; elytra also with a large dorsal dark patch which commmences at the base and is continued to beyond the middle, a few whitish scales—scarcely, however, affecting its appearance—scattered about; its sides are rather uneven, and are bounded by rather pale-ochreous scales; beyond the patch and extending to the apex is a small patch of brownish scales. Under-surface with white, the legs with pale-ochreous scales.

Rostrum feebly curved, scarcely longer than prothorax; with sharply-raised costæ (of which, however, the median one is feeble and somewhat irregular), terminating either level with or just in front of antennæ; apical portion sparsely but moderately strongly punctate. Antennæ rather stout; scape inserted three-sevenths from apex of rostrum, just passing apex, shorter than funicle; first joint of funicle slightly longer than second-third, seventh transverse; club ovate, almost the length of four preceding joints. *Prothorax* rather strongly transverse, apex not much narrower than base, but rather suddenly lessened, ocular lobes feeble; densely punctate. *Elytra* oblong-cordate, apex conjointly rounded; striate-punctate, striæ very feeble. *Prosternal channel* distinct, apex moderately emarginate. Abdomen with third and fourth segments strongly drawn backwards at sides. Claw joint of anterior *tarsi* rather strongly exserted. Length, $2\frac{1}{2}$ mm.; rostrum, $\frac{2}{3}$ mm.

Hab.—N.S.W.: Tamworth.

Possibly close to *E. umbrosa* (Blkb.), but without "an unusually short robust antennal club;" appears to be close to *ocellata* (Blkb.), but the dark elytral patch is continued to beyond the middle, and the prothorax is without inequalities. I have two specimens, and both are males.

STOREUS INDISTINCTUS, *n. sp.*

Male. Elliptic-ovate. Dark-red, elytra stained with piceous about the middle. Clothing somewhat resembling the preceding, but the dark patches on both prothorax and elytra are rather feebly defined, and are bounded by dingy ochreous scales.

Rostrum with much feebler costæ than in the preceding; prosternal channel not so distinct, apex less deeply emarginate; abdomen with third and fourth segments less angular at sides,

and the anterior claw joint less strongly exserted. All else as in preceding.

Hab.—N.S.W.: Galston.

Very close to the preceding species, but I believe it to be distinct.

STOREUS CONSUETUS, *n. sp.*

Male. Elliptic, moderately robust. Dull-red, metasternum somewhat darker. Head and basal portion of rostrum with ochreous-white and moderately dense scales, denser between eyes than elsewhere. Upper-surface with ochreous and pale-ochreous scales, the elytra with a number of slightly darker subquadrate spots, the whole having a distinctly tesselated appearauce.

Rostrum longer than prothorax and scutellum combined, straight to antennæ, and then rather strongly bent downwards; with sharply-raised costæ (more or less concealed by clothing) continued, but feeble and irregular, beyond antennæ. Antennæ moderate; scape inserted one-fourth from apex of rostrum, about half passing, the length of funicle and two basal joints of club; first joint of funicle almost the length of second-fourth, second distinctly longer than third, fourth transversely triangular, fifth-seventh strongly transverse; club ovate, longer than three preceding joints. *Prothorax* strongly transverse, sides rounded, apex rather suddenly narrowed; densely punctate. *Elytra* sub-oblong-cordate, apex scarcely emarginate; striate-punctate, striæ very feeble. *Prosternal channel* distinct, apex deeply emarginate. Abdomen with third and fourth segments gently arcuate throughout. Length, $2\frac{2}{3}$ mm.; rostrum, $\frac{3}{4}$ mm. (female, 1 mm.).

Female. Differs in having the rostrum longer and more strongly curved, less densely squamose, and the costæ much feebler; the antennæ inserted almost in middle of rostrum, scape not passing apex, and almost the length of funicle and club comkined; club elliptic-ovate.

Hab.—N.S.W.: Forest Reefs, Tamworth, Galston.

It is possible that this species is Mr. Pascoe's *E. lineigera*, but if so the words "capite inter oculos abrupte calloso" are certainly misleading. The tesselation of the elytra is much as in *tessellatus*, but is rather less pronounced.

STOREUS INVIDIOSUS, *n. sp.*

Male. Elliptic-ovate. Dull-red, elytra stained with piceous along suture; prothorax and metasternum brownish. Head closely covered with ochreous-white scales, slightly denser and narrower, and feebly raised between eyes; rostrum rather sparsely squamose to antennæ, from thence to apex the sides very feebly setose. Prothorax with ochreous scales rather sparsely distributed, each side of base with a short stripe of

white scales; elytra with a feeble tesselated appearance, and with whitish scales forming a feeble semicircle about scutellum, a very feeble short fascia across suture at summit of posterior declivity, and a more distinct one across middle. Under-surface and legs with somewhat ochreous scales.

Rostrum rather robust, moderately curved, scarcely longer than prothorax; costæ irregular and not acute, the median one divided from base to antennæ. Antennæ comparatively stout; scape inserted two-fifths from apex, about one-fourth passing, shorter than funicle; funicle with second-fourth joints feebly doubled, first shorter than second-fourth, sixth-seventh transverse; club ovate. *Prothorax* transverse, apex considerably less than base, but not suddenly narrowed; coarsely punctate. *Elytra* elongate-cordate, apex lightly emarginate; seriate-punctate, punctures rather coarse. *Prosternal channel* distinct and rather deep, apex deeply emarginate, separation of anterior coxæ very distinct. Abdomen with third and fourth segments straight, except at sides. Length, $2\frac{1}{2}$ mm.; rostrum, $\frac{1}{2}$ mm.

Hab.—N.S.W.: Galston, Sydney, Queanbeyan.

Appears to be close to *E. ocellata* (Blackburn), but the description of the clothing, prothoracic tuberosities, and rostrum of that species will not fit any of my (seven) specimens.

Storeus juvencus, *n. sp.*

Male. Elongate-ovate. Red, metasternum somewhat darker. Head not very closely covered with pale ochreous-white scales, between the eyes rounder and paler than on vertex; rostrum (except at extreme base) rather sparsely squamose, a few scales beyond antennæ. Upper-surface with ochreous and pale-ochreous scales, giving it a rather distinctly tesselated appearance. Under-surface and legs with pale-ochreous scales.

Rostrum moderately curved, the length of prothorax and scutellum combined, feebly diminishing from base to antennæ; acutely costate, the median costa narrower than the others; apical portion rather finely punctate. Scape inserted two-sevenths from apex of rostrum, more than half passing, shorter than funicle and club; first joint of funicle shorter than second-fourth, seventh transverse; club ovate. *Prothorax* transverse, apex not much narrower than base. *Elytra* elongate-cordate, apex emarginate; striate-punctate, striæ feeble, punctures rather large and subquadrate. *Prosternal channel* distinct and rather wide, apex not deeply emarginate. Abdomen with third and fourth segments feebly curved. Length, $2\frac{1}{8}$ mm.; rostrum, $\frac{2}{3}$ mm.

Hab.—W.A.: Bunbury.

The scales between the eyes are very peculiar compared with those of all the other species known to me.

STOREUS MEDIOCRIS, *n. sp.*

Male. Elongate-elliptic. Dark-red. Head and rostrum to antennæ moderately densely clothed with dingy-white scales, denser between eyes than elsewhere. Upper-surface clothed with dingy-ochreous or griseous scales, having a feeble tesselated appearance.

Rostrum feebly curved, the length of prothorax and scutellum combined, parallel (except for a very slight increase between base and antennæ); with sharp, somewhat irregular costæ, which are more or less concealed by clothing; the median costa continued to apex, the others continued but feeble beyond antennæ; apex strongly punctate, the interspaces densely and finely punctate. Antennæ comparatively stout; scape inserted one third from apex of rostrum, half passing, the length of funicle and first joint of club; first joint of funicle slightly longer than second-third, second distinctly longer than third, fourth-seventh transversely subtriangular; club ovate, slightly longer than usual in the sex, equal to four preceding joints. *Prothorax* widely transverse, sides strongly rounded, apex slightly narrower than base. *Elytra* elongate-cordate, apex conjointly rounded; seriate-punctate, punctures rather small, sides striate. *Prosternal channel* distinct, apex moderately deeply emarginate. Abdomen with third and fourth segments strongly arcuate throughout, apical segment longer than usual. Anterior *tibiæ* rather distinctly bisinuate beneath; claw joint rather strongly exserted. Length, $2\frac{2}{3}$ mm.; rostrum, $\frac{2}{3}$ mm. (female, $\frac{7}{8}$ mm.).

Female. Differs in having the rostrum thinner (but not much longer), a little more noticeably curved, and without scales or costæ; the position of the median costa is entirely unmarked, and the lateral ones are represented by rows of punctures; the antennæ are slightly thinner, inserted in middle of rostrum, scape not extending to apex, and shorter than funicle, and the club is elongate-ovate.

Hab.—N.S.W.: Hillgrove (Dr. C. Hardcastle), Armidale (McDonald and Lea).

The second-fourth joints of the funicle in the male are apparently feebly doubled.

STOREUS OCCIDENTALIS, *n. sp.* or *var.*

Male. Close to the preceding, but differs in having the rostrum perfectly parallel between base and antennæ, and very feebly incurved between antennæ and apex, and slightly longer; elytra more coarsely punctate, prosternal channel wider; third and fourth abdominal segments less arcuate, and the apical segment of normal size. Length, $2\frac{2}{3}$ mm.; rostrum, $\frac{7}{8}$ mm.

Hab.—W.A.: Geraldton.

Remarkably close to the preceding, but (leaving out of consideration the great distance apart at which they were obtained) the differences as noted above would appear to denote specific, or at least varietal rank.

Storeus variegatus, *Bohem.*

In the male of this species the rostrum is supplied with seven costæ, of which, however, the three median are not sharply defined, though sufficiently distinct; the scape is slightly longer than the funicle and club combined, and the club is ovate. The female differs in having a much longer rostrum, carinate at sides only, feebly squamose at sides of base, and the apex sparsely punctate; the antennæ are thinner, the scape just passes the apex of rostrum, and the club is elongate-ovate.

The size is variable, and the males are usually, but not always, smaller than the females. There is usually to be seen a more or less V-shaped mark beyond the middle of the elytra, but in one specimen under examination the whole upper-surface is uniformly clothed with greyish scales.

Storeus (Emplesis) majusculus, *Blkb.*

I have three specimens of this species. One of them, a male, has already been commented upon by Mr. Blackburn. It has the rostrum with six acute costæ and a seventh (median) scarcely defined towards base, but moderately distinct towards apex. The female differs in having the costæ defined only at the sides, the apex of rostrum with sparse elongate punctures and the club reddish (in the male it is blackish). The clothing is slightly variable. The antennæ of both sexes are much as in *S. variegatus.*

Storeus (Emplesis) filirostris, *Pasc.*

In the male of this species all the joints of the funicle are apparently doubled (the seventh to a less noticeable extent.) This doubling is caused by an apparent short supplementary joint near the apex of each, except in the third, where it is basal. The rostrum has seven acute costæ, but they are somewhat obscured by scales; the median one terminates before the antennæ, and the extreme lateral ones are continued beyond them. The female differs in having a longer and thinner rostrum, not squamose except at extreme base; carinæ feeble, the three median obsolete, and with scattered small punctures; the antennæ are longer and thinner, the scape terminates before apex of rostrum, and the club is elongate-ovate.

Femora dentate.
- Prosternum scarcely canaliculate ... ... *variegatus*, Boh.
- Prosternum distinctly canaliculate.
  - Rostrum black ... ... *amœnus*, n. sp.
  - Rostrum more or less red.
    - Upper-surface entirely red ... ... *variabilis*, n. sp.
    - Upper-surface black, more or less variegated with red.
      - Sutures of third and fourth abdominal segments feebly arcuate throughout. *contortus*, n. sp.
      - Sutures straight, except at the sides ... *captiosus*, n. sp.

Femora edentate.
- Intercoxal process of mesosternum level, or almost level, with coxæ.
  - Rostrum piceous-black ... . *monticola*, Blkb.
  - Rostrum red.
    - Funicle with first joint as long as the three following combined ... ... *lithostrotus*, n. sp.
    - Funicle with first joint shorter than the three following combined.
      - Club the length of three preceding joints *femoralis*, n. sp.
      - Club the length of four preceding joints.
        - Rostrum of male but little longer than prothorax ... . *ignobilis*, n. sp.
        - Rostrum of male considerably longer than prothorax.
          - Scape of male extending to apex of rostrum ... ... *mundus*, Blkb.
          - Scape of male considerably passing apex of rostrum.
            - Funicle with seventh joint transverse *gravis*, Blkb.
            - Funicle with seventh joint as long as wide ... ... *filirostris*, Pasc.
- Intercoxal process depressed.
  - Head tuberculate between eyes ... ... *tuberculifrons*, n. sp.
  - Head sometimes fasciculate, but never tuberculate, between eyes.
    - Upper-surface with more or less erect setæ, in addition to the scales.
      - Club red.
        - Size very small ... ... *parvulus*, n. sp.
        - Size very much larger ... ... *majusculus*, Blkb., female.
      - Club black, or piceous-black.
        - Prothorax suddenly lessened in front, size large.
          - Scales on prothorax much paler at sides than on disc ... ... *majusculus*, Blkb., male.
          - Scales on prothorax almost uniformly blackish-brown ... ... *falsus*, n. sp.
        - Prothorax not suddenly lessened in front, size small.
          - Scales pale.
            - Body briefly ovate ... ... *canaliculatus*, n. sp.
            - Body elongate-elliptic ... ... *setosus*, n. sp.
          - Scales dark.
            - The white setæ at sides very thin, size very small ... ... *cryptorhynchus*, n. sp
            - The white setæ moderately stout, size larger ... ... *inamœnus*, n. sp

Upper-surface without erect setæ.
Club black or piceous-black.
Elytra variegated with black and white scales along the suture ... ... *bellusus*, n. sp.
Elytral suture not specially variegated.
Club the length of four preceding joints combined.
Scape the length of funicle and club combined ... ... *impotens*, n. sp.
Scape shorter ... ... *brachyderes*, n. sp.
Club shorter than four preceding joints combined.
Metasternum and abdomen black *cyphirhinus*, n. sp.
Metasternum and abdomen red ... *pauperculus*, n. sp.
Club concolorous with or slightly paler than funicle.
Elytra with scales forming an almost complete transverse black fascia behind the middle ... ... *nigrofasciatus*, n. sp.
Elytra without a transverse black fascia.
Prosternum very feebly canaliculate.
Club shorter than four preceding joints ... ... *macrostylus*, n. sp.
Club the length of four preceding joints.
Anterior tibia curved throughout, rostrum of male considerably longer than prothorax ... *arcuatus*, n. sp.
Anterior tibia straight on its outer edge, rostrum of male very little longer than prothorax ... ... *ellipticus*, n. sp.
Prosternum, at least in front of the anterior coxæ, distinctly canaliculate.*
Scape slightly longer than funicle and club combined ... ... *dispar*, n. sp.
Scape shorter than funicle and club combined.
Funicle with first joint as long as three following combined.
Scales of elytra forming a tessellated pattern.
Funicle with seventh joint transverse ... ... *assimilis*, Blkb.
Funicle with seventh joint not transverse ... ... *tessellatus*, n. sp.
Scales of elytra condensed to form a large whitish patch just beyond the middle ... *epphipiger*, n. sp.
Scales of elytra almost uniform in colour.
Body ovate ... ... *multiarticulatus*, n. sp.
Body elongate-ovate ... *niveiceps*, n. sp.
Funicle with first joint shorter than three following combined.

* The characters hereafter given refer only to the males.

Scales of elytra condensed to form a large black dorsal patch, commencing at the base.	
Abdomen, exeept extreme apex, black	*dorsalis*, n. sp.
Abdomen dull-red	*indistinctus*, n. sp.
Scales of elytra not condensed into a black patch.	
Metasternum black or piceous.	
Elytra with tesselated pattern only	*consuetus*, n. sp.
Elytra with transverse markings in addition ...	*invidiosus*, n. sp.
Metasternum reddish.	
Apical portion of rostrum finely punctate ...	*juvencus*, n. sp.
Apical portion coarsely punctate.	
Rostrum slightly dilated between base and antennæ	*mediocris*, n. sp.
Rostrum perfectly parallel between base and antennæ	*occidentalis*, n. sp.

Cyttalia.

The type of this genus (*C. griseipila*) appears to be unknown to Australian entomologists. Mr. Blackburn, at the date* of publishing his tabulation of the Erirhinid genera, doubtfully describes two species (*tarsalis* and *Sydneyensis*) as congeneric, and associates them with *Diapelmus ventralis* and *Erichsoni* (Pascoe). These four species I know, and they certainly are congeners. I believe with Mr. Blackburn that Mr. Pascoe was wrong in referring the two latter species to *Diapelmus* (Erichson describes the rostrum as "lineare," and the eyes as "haud prominuli"); at the same time it is hardly likely that they can belong to *Cyttalia*.† Mr. Blackburn remarks‡:—"It is, I think, at any rate certain, that if the species I have called *Cyttalia* are not really congeneric with that on which the genus was founded, they cannot be referred to any other characterised genus." I have a species from Western Australia which I believe to be a true *Cyttalia*, but which has appendiculate claws; it is even possible that it is *C. griseipila*, with the description of which it closely agrees, and had my specimens been taken in Sydney I should have had little doubt in referring them to that species. I

* T.R.S., S.A., 1894.

† It seems scarcely probable that Mr. Pascoe would designate a new genus, without at least referring to the species referable to it, and previously described by him.

‡ *L.c.*, p. 147.

think that a new genus is required to receive the four species mentioned, together with a number described below, and some others with which I am acquainted, but do not describe through paucity of material; but until *C. griseipila* becomes better known, it seems advisable to refer them to *Cyttalia*.

In these species I do not think that the scape can be said to *pass* the eye; it terminates below the eye, and either level with or just beyond a line drawn parallel with the prothorax from the extreme base of the eye, but if it were placed on the eye itself the termination of the scape would be at or just beyond its middle.

The species here described have the following specific details in common:—Head densely punctate; between the eyes in female as wide as rostrum, in male (owing to the enlargement of the eyes) a little narrower. Rostrum stout, densely punctate. Prothorax distinctly transverse, densely punctate, its setæ transversely decumbent, sides increasing in width to near base. Elytra wider than prothorax, parallel-sided, shoulders feebly rounded, striate-punctate. Femora thickened.

The principal differences lie in the colour, length of rostrum, comparative length of the scape, and the elytral clothing and punctures.

Cyttalia impura, *n. sp.*

Reddish- or testaceous-brown; legs reddish, the femora tinged with piceous in male; scape red, funicle (basal joint excepted) and club infuscate. Moderately densely and almost uniformly clothed with whitish setæ.*

Rostrum distinctly longer than prothorax. Scape the length of funicle and club combined. Punctures in elytral striæ moderately large and subquadrate; interstices feebly convex and rather feebly punctate. Anterior femora as thick as posterior, edentate. Length (including rostrum), $2\frac{1}{2}$—$2\frac{3}{4}$ mm.

Hab.—W.A.: Mount Barker, Albany.

A soberly coloured species.

Cyttalia parva, *n. sp.*

Testaceous-brown, elytra but little paler; sterna and abdomen (the apical segments reddish) black, legs and antennæ testaceous, club (basal joint excepted) blackish. Elytra moderately clothed with whitish setæ, each of the interstices with a line of setæ.

Rostrum shorter than prothorax. Scape slightly longer than funicle. Punctures in elytral striæ moderately large, distinct

* The clothing of the prothorax (except to a slight extent in its density) is uniform in all the species tabulated by me. On the under-surface it is always white and denser and finer than on the elytra.

only towards base; interstices slightly convex, very feebly punctate. Anterior femora edentate. Length, $1\frac{7}{8}$ mm.

Hab.—W.A.: Mullewa.

A dingy species, and the smallest one I am acquainted with in the genus.

CYTTALIA NIGRICLAVA, *n. sp.*

Pale-testaceous; under-surface (except apical segments of abdomen) tinged with piceous; club black. Elytra rather more densely setose than is usual.

Rostrum shorter than prothorax. Scape almost the length of funicle and club combined. Punctures in elytral striæ feeble; interstices rather wide, almost flat, feebly punctate. Anterior femora distinctly dentate. Length, $2\frac{1}{2}$ mm.

Hab.—Swan River.

A pale, moderately distinct species.

CYTTALIA INORNATA, *n. sp.*

Testaceous, occasionally reddish-testaceous; apical half of club infuscate. Clothing (except that on the upper-surface it is yellower) as in *parva*.

Rostrum about two-thirds the length of prothorax, grooved in middle towards apex, and less noticeably so between middle and scrobes. Scape the length of funicle and club combined. Punctures in elytral striæ distinct towards base, becoming feebler towards apex; interstices convex, moderately wide, finely punctate. Anterior femora feebly dentate. Length, $2\frac{1}{2}$—3 mm.

Hab.—W.A.: Albany, Mount Barker, Swan River, Geraldton.

Somewhat variable in size, and slightly variable in the depth of colour.

CYTTALIA MACULATA, *n. sp.*

Head and basal two-thirds of rostrum black, prothorax dark-red, its apex darker; elytra reddish-testaceous or reddish-piceous, each with a fairly distinct piceous spot about the middle; under-surface (apical segments of abdomen excepted) piceous, legs testaceous; antennæ reddish, club and part of funicle infuscate. Each of the elytral interstices with a distinct line of rather stout whitish setæ, elsewhere feebly setose.

Rostrum slightly longer than prothorax, feebly but noticeably curved. Eyes almost circular. Scape thin, the length of funicle and club combined. Punctures in elytral striæ very distinct and subquadrate, striæ deeper towards sides than in middle. Anterior femora very feebly dentate. Length, $2\frac{1}{2}$ mm.

Hab.—Geraldton, Swan River.

Very distinct (as are also the three following species) on account of its colour.

CYTTALIA ACACIÆ, *n. sp.*

Head, rostrum (except apex), prothorax, and scutellum piceous; elytra testaceous, tinged with piceous about scutellum and the sides, and very feebly along the suture; under-surface black in male, the abdomen excepted in female; legs and antennæ testaceous, club black. Elytra with moderately dense, short setæ or pubescence, interstices each with a line of comparatively short setæ.

Rostrum subequal in length with prothorax, feebly curved. Scape the length of funicle only. Punctures in elytral striæ very distinct towards base and sides; striæ deeper at sides than in middle; interstices convex, scarcely visibly punctate. Anterior femora edentate. Length, $2\frac{1}{2}$ mm.

Hab.—Geraldton.

Specimens were beaten in abundance from *Acacia* blossoms, and were usually densely covered with pollen.

CYTTALIA NIGRA, *n. sp.*

Entirely black. Elytra with fine white pubescence, each of the elytral interstices with a line of short setæ, not (as in all the other species here described, except *impura*) placed in single file.

Rostrum shorter than prothorax. Scape slightly shorter than funicle. Elytra strongly striate-punctate, punctures everywhere distinct, striæ (especially towards sides and suture) rather deep, interstices convex and densely punctate towards base. Anterior femora edentate. Length, $2\frac{1}{3}$—3 mm.

Hab.—Swan River.

Numerous specimens were obtained by means of the sweep net.

CYTTALIA RUFIPES, *n. sp.*

Black, legs and antennæ (club black) pale reddish-testaceous. Elytra with short yellowish pubescence, and with fine lines of yellowish setæ.

Rostrum shorter than prothorax. Scape slightly shorter than funicle. Punctures in elytral striæ feeble except towards base and sides; interstices feebly convex, and rather densely punctate. Four anterior femora edentate, teeth of posterior large, but smaller than usual. Length, $2\frac{1}{2}$—$2\frac{3}{4}$ mm.

Hab.—Swan River.

CYTTALIA SYDNEYENSIS, *Blackb.*

Mr. Blackburn, at the foot of his description of this species, remarks having seen examples with a blackish metasternum, &c., and of which he says, "I cannot satisfy myself represent a distinct species." I have a pair taken *in cop*, in which the metasternum and scutellum are black in the male, and scarcely

darker than the general colour in the female. This sexual variation of the under-surface appears in several other species, *e.g.*, *ventralis* and *acaciæ*.

C. TARSALIS, *Blackb.* *Hab.*—N.S.W.: Queanbeyan.

C. ERICHSONI, *Pasc.* *Hab.*—N.S.W.: Tamworth.

C. VENTRALIS, *Pasc.* *Hab.*—W.A.: Geraldton, Swan River.

Derm reddish or testaceous, elytra almost or quite concolorous with prothorax.
  Rostrum slightly longer than prothorax.
    Club and almost the entire funicle infuscate ... *impura*, n. sp.
    Club infuscate, funicle not ... ... *Sydneyensis*, Blkb.
  Rostrum the length of or slightly shorter than prothorax.
    Tarsi infuscate ... ... *tarsalis*, Blkb.
    Tarsi concolorous with tibiæ.
      Length (including rostrum) less than 2 mm. ... *parva*, n. sp.
      Length at least $2\frac{1}{2}$ mm.
        Club entirely black ... ... *nigriclava*, n. sp.
        Apex only of club black (or piceous).
          Metasternum black; abdomen red in female, black in male ... ... *ventralis*, Pasc.
          Metasternum and abdomen reddish, not sexually variable.
            Rostrum feebly or moderately grooved in middle near apex ... ... *inornata*, n. sp.
            Rostrum not grooved ... ... *Erichsoni*, Pasc.
Elytra with two piceous spots... ... ... *maculata*, n. sp.
Prothorax piceous; elytra pallid tinged with piceous about scutellum and along suture .. ... *acaciæ*, n. sp.
Black.
  Legs black ... ... *nigra*, n. sp.
  Legs pallid ... ... *rufipes*, n. sp.

GLAUCOPELA RUFA, *n. sp.*

Dark-red, sterna sometimes piceous. Clothed with yellowish setose pubescence, on the prothorax leaving six nude spaces—one on each side, two at base, and two at apex; elytra with pubescence more or less linear in arrangement and frequently interrupted, and leaving three more or less distinct semi-nude spaces—one near base, one near apex, and one behind middle. Under-surface with greyish-yellow pubescence.

Eyes large, round, depressed. Rostrum distinctly longer than prothorax, sexually variable in length; finely punctate; shining. *Prothorax* transverse, sides rounded, base about twice the width of apex; densely and strongly punctate. *Elytra* wide, short, much wider than prothorax; punctate-striate, interstices wider than striæ, and seriate-punctate. Length, 2 mm.; rostrum, $\frac{1}{2}$—$\frac{2}{3}$ mm.; width, $1\frac{1}{5}$ mm.

Hab.—W.A.: Swan River; N.S.W.: Whitton.

In colour this species is different to all its described congeners, being of an uniform dark- or brownish-red. The rostrum is

decidedly longer than usual, but the insertion of the scape is as in all the other species.

Glaucopela instabilis, *n. sp.*

Black; rostrum (except base), antennæ, tibiæ, and tarsi red. Upper-surface with white or whitish scales, mixed with black or other scales; under-surface and femora with white scales, tinged with blue or green.

Rostrum rather wide, shorter than prothorax; strongly punctate, more densely towards base than apex. *Prothorax* almost twice as wide as long; densely punctate. *Elytra* suboblong, considerably wider than prothorax, parallel-sided to near apex; striate-punctate, interstices rather wide, feebly convex, and finely punctate. Length, 2 mm.; rostrum, $\frac{2}{3}$ mm.; width, 1 mm.

Hab.—W.A.: Geraldton, Swan River, Beverley.

The clothing of this species is excessively variable, and is not exactly the same in any two specimens out of about forty under examination. The scales on the prothorax are usually paler at the sides than on the disc; there is usually a pale median line dividing two dark patches of scales; sometimes the line is entirely absent, and the discal scales may be entirely black, or coppery-yellow, or of a dull-white; in an occasional specimen the prothorax is clothed with black scales, except for a feeble line of white at the base and side. The clothing of the elytra is even more variable than of the prothorax, the paler scales may be of a dead-white, or coppery, or tinged with blue; they may occupy almost the entire surface, or be distributed as feeble spots; in some specimens the black scales form six more or less distinct spots; in others the white scales form scutellar and sutural markings, and three more or less interrupted transverse fasciæ.

Derm reddish	*rufa*, n. sp.
Derm black or piceous-black.	
Legs red	*fuscomarmorea*, Blkb.
Femora black, tibiæ and tarsi red.	
Clothing uniform	*varipes*, Blkb.
Clothing more or less variegated.	
Elytra squamose and setose	*distincta*, Blkb.
Elytra squamose only	*instabilis*, n. sp.

G. unicolor (Pascoe) is described as being two lines in length. Of the above species *distincta* is the largest, and measures but one and one-half lines.

Myositta carpophaga, *n. sp.*

Head and rostrum red, prothorax reddish-testaceous; elytra, under surface, legs, and antennæ testaceous. Clothed with very fine yellow pubescence, absent on head (except between eyes) and disc of prothorax.

Head densely punctate, finely towards base, coarsely between eyes; eyes ovate. Rostrum moderately stout, feebly curved, finely punctate, in male the length of prothorax, in female distinctly longer. Scape slightly longer than funicle, in male inserted distinctly nearer apex than base of rostrum and considerably passing apex, in female inserted almost in exact middle and just passing apex. *Prothorax* transverse, sides rounded and increasing to base, densely and slightly irregularly punctate. *Scutellum* semicircular, finely punctate. *Elytra* longer than prothorax, head, and rostrum combined, and not much wider than prothorax, sides parallel to near apex, shoulders oblique; striate-punctate, punctures subquadrate, larger in male than in female; interstices convex, finely punctate. *Under-surface* densely and finely punctate. *Femora* thickened; posterior very strongly, intermediate slightly, anterior not at all dentate. Length, male, 6 mm.; rostrum, $1\frac{1}{6}$ mm.; width, 2 mm.; (female, length, $6\frac{2}{3}$ mm.; rostrum. $1\frac{2}{3}$ mm.).

Hab.—N.S.W.; Galston. (Reared and beaten from cones of a species of *Banksia*).

A pallid species allied to *cirrifera* (Pascoe) from which it is readily distinguished by its narrower form, paler colour, and absence of elytral spots. It appears to be close to *tabida* (Pascoe) but differs from the description of that species in being considerably larger, and with a transverse prothorax; the elytra are elongate and parallel-sided, and each of their punctures (when seen from above) appears to be surrounded by a darker ring. Pascoe says of *tabida* that they "appear in certain lights to be surrounded by a paler ring."

Myositta apionomorpha, *n. sp.*

Black (the female occasionally dark piceous-brown); scape and first joint of funicle red, rest of the antennæ black. Elytra with short and very sparse adpressed white setæ, and with longer sparse and suberect setæ; under-surface with moderately dense white pubescence.

Head strongly punctate between eyes, finely and sparsely towards base; eyes subovate, more prominent, and less widely separated in male than in female. Rostrum rather slender, slightly curved, distinctly longer than prothorax; with rather strong elongate punctures; a distinct longitudinal impression between antennæ. Scape the length of funicle, inserted at about one-third from, and considerably passing apex of rostrum in male, in female inserted at about two-fifths from and just passing apex. *Prothorax* slightly longer than wide, sides rounded and increasing to near base; densely but somewhat irregularly

and shallowly punctate. *Scutellum* transverse, semicircular, finely punctate. *Elytra* much wider than prothorax, shoulders slightly rounded, sides in male parallel to near apex, in female slightly dilating to beyond the middle; feebly striate, strongly punctate, punctures larger and closer together in male than in female; interstices feebly convex, highly polished and scarcely visibly punctate, in female wider than punctures, in male wider on disc, narrower on sides. *Under-surface* minutely punctate, metasternum almost microscopically transversely corrugate. *Legs* rather long; femora thickened, all (but especially the posterior pair) very strongly dentate. Length, male, $3\frac{1}{5}$ mm.; rostrum, 1 mm.; width, $1\frac{1}{5}$ mm. (female, length, $4\frac{2}{5}$ mm.; rostrum, $1\frac{3}{5}$ mm.).

Hab.—Galston (on *Banksia* sp., Dumbrell and Lea).

Very distinct from any previously described species.

Myositta banksiæ, *n. sp.*

Of an uniform (except that the antennæ and legs are very slightly paler) and rather dark-red. Sides of prothorax with yellowish pubescence; elytra with sparse, semi-erect, stout, yellow setæ; under-surface very sparsely pubescent (except in front of anterior coxæ, between and at sides of intermediate and at sides of posterior coxæ).

Head densely punctate, moderately coarsely between eyes, finely towards base; eyes large, subovate, larger and more prominent in male than in female. Rostrum of male the length of prothorax, distinctly curved; strongly punctate; with a distinct longitudinal impression between antennæ; of female considerably longer than prothorax, and almost straight. Antennæ as in preceding, except that the scape is longer than the funicle. *Prothorax* transverse, sides rounded, base but little wider than apex; moderately densely but shallowly punctate; with an almost impunctate median line. *Scutellum* small, subtriangular. *Elytra* much wider than prothorax, shoulders rounded; sides in female parallel to near apex, in male very feebly decreasing from shoulders; striate punctate, punctures moderately large; interstices wider than punctures, convex, and frequently transversely impressed, so that each appears to be composed of feeble oblong spaces having a slightly granulate appearance. *Under-surface* highly polished, very minutely punctate. *Legs* moderately long; femora thickened, posterior very strongly dentate, the others rather feebly dentate. Length, male, $4\frac{1}{6}$ mm.; rostrum, 1 mm.; width, $1\frac{2}{5}$ mm. (female, length, $4\frac{1}{3}$ mm.; rostrum, $1\frac{3}{5}$ mm.).

Hab.—Galston (on several species of *Banksia*, Dumbrell and Lea).

A large female measures 6 mm. The species is allied to the preceding, from which, however, it is abundantly distinct. I know of no other species possessing similar elytral interstices. From the description of *rufula* (Pascoe) it differs in being very shining and differently clothed, third tarsal joint not strongly dilated, &c.

M. CIRRIFERA, *Pasc. Hab.*—Galston, Tasmania.

M. MELANOCEPHALA, *Pasc. Hab* —King George's Sound, Swan River.

Notes on the Geology of Kangaroo Island, with Special Reference to Evidences of Extinct Glacial Action.

By Walter Howchin, F.G.S.

Plates IV., V.

[Read July 4, 1899.]

On several previous occasions I have been permitted to place before this Society notes in elucidation of the extinct glacial field comprehended within the limits of the Cape Jervis Peninsula. At the southern extremity of this area, more particularly, there occurs some very striking illustrations of Glacial Till, forming low coastal hills a hundred feet in height. From the Lighthouse situated at the Cape the cliffs of Kangaroo Island are clearly distinguishable across the Strait at a minimum distance of eight miles. From the thickness of the glacial deposits at the Cape it appeared highly probable that they would be found, if searched for, on Kangaroo Island as well as on the mainland.

The earliest opportunity was seized to test this point by a visit to the Island undertaken in the last week of 1898. Whilst pursuing the main object of my visit during the limited time at my disposal, I was able to make a few general observations on the geology of the Island, which may conveniently be included in the present paper.

Eocene.

Queenscliffe.—At Beare's Point, a little north of the Queenscliffe Jetty, and for a mile to the southward of the Point, the cliffs consist of Eocene limestones. Near the Jetty the stone is almost entirely polyzoanal in composition, and in places is so loosely cemented that it frets away rapidly by exposure to the weather. About half a mile from the Jetty, on the south side, the limestone becomes stronger, and is of a bright pink colour, undistinguishable from the pink-coloured Eocene limestone of the head waters of the Hindmarsh River.* The limestone is quarried on the beach and shipped for flux. Near the Jetty the Eocene beds have a dip of 15° S.E., which increases in a southerly direction to 25° S.E., where they pass out of sight under more recent formations.

* Trans. and Proc. Roy. Soc., S. Aus., vol. XXII., 1898, p. 15.

For about a mile on their southern limits these Tertiary beds are overlain by a remarkable travertine conglomerate, the included stones consisting entirely of rounded pebbles of basalt, which appear in striking contrast to the white cement in which they are embedded. The parent rock from which the basalt has been derived exists in situ about one-and-a-half miles to the north-west. The conglomerate reaches a maximum thickness of from three to four feet, and is sparingly fossiliferous. Two shells, *Truncatella marginata* and *T. scalarina*, are present in considerable numbers. The Truncatellæ have their habitat in the higher littoral zone, and as the bed in which they have been preserved is from ten to twelve feet above present sea level, it supplies evidences of an elevation of the coast line within recent times. The exclusive character of the embedded stones makes it probable either that the basaltic sheet, just referred to as their source, extended as far south as the site of the conglomerate bed at the time of its formation, or that the deposit was formed at the mouth of a river which had its drainage almost exclusively over the basaltic area.

Smith's Bay.—An inconspicuous outcrop of Eocene limestone also occurs in Section 317, Hundred of Menzies, on the banks of a creek a little west of the Cape Borda main road. It is situated about two miles south-west of Smith's Bay. The fossiliferous limestone occurs in broken fragments on the surface of the ground.

Basalt.

Kingscote and Gap Hills.—The sea cliffs which trend north from Queenscliffe Jetty exhibit some very interesting geological features. At the old Jetty near Kingscote, three quarters of a mile north of Queenscliffe, a very instructive section is visible A basaltic cap, about a hundred feet in maximum thickness, forms the greater part of the cliff face, thinning out to nothing on either side. The igneous rock is greatly jointed, both vertically and horizontally, breaking up by weather action into vertical prisms of small size. This fissured condition of the stone makes it readily serviceable for road metal, and formally it was shipped to Port Adelaide for this purpose.

The basalt at this point occupies an eroded valley about a quarter of a mile wide, in a white, friable, quartzose sandstone, which sometimes passes into a coarse grit. The sandstone is horizontal, and in places exhibits false bedding. It has a thickness of about 40 feet at Kingscote, and contains, particularly near its base, large concretionary nodules of ironstone. As these ferruginous concretions, when exposed, weather into large cup-shaped masses, they are sometimes locally used as drinking troughs for poultry.

The basaltic cap continues uninterruptedly along the high ground from Kingscote to the Bluff, at the entrance to the Bay of Shoals, a distance of about two miles. It is evident that originally this basaltic sheet covered a much greater extent of country than it does at present, having been subjected to extensive denudation that has broken up the original igneous plateau into isolated areas, separated by miles of low land. It reappears at Rettie's Bluff, five miles to the west of Kingscote, and forms the table-topped summits of the Gap Hills, extending in a lineal direction, with some interruptions, from Kingscote to Smith's Bay, a distance of twelve miles.

The underlying sandstone, already referred to, can be traced round the Kingscote Point to the Bluff, and reappears under the basalt in the Gap Hills, and extends at least as far as Smith's Bay. At the latter place, near the residence of Mr. George Turner, the sandstone was eroded, before the volcanic overflow, into a considerable mound, around and over which the basalt has flowed. The section can be seen in a deep gully that has been cut through the igneous cap, and exposed the underlying beds.

The geological age to which this igneous activity must be referred is at present uncertain, but probably it took place in late Tertiary, or even Post Tertiary times, and might be synchronous with the great volcanic phenomena that was a marked feature of the Mount Gambier and Southern Victorian areas about that period.

Glacial.

Kingscote.—In the sea cliffs at Kingscote the white sandstone underlying the basalt is itself underlain by a stiff, blue, and mottled clay at sea level, which continues in a southerly direction to the Queenscliffe Jetty, and follows the coast to the northward along the southern shores of the Bay of Shoals. Its presence on the beach makes the ground sticky and unpleasant to walk upon. The line of junction between this clay and the Eocene beds at Beare's Point is not very distinct, but appearances seem to indicate that it occupies a position inferior to the Tertiary limestones.

Resting on this clay along the beach a few erratics were noticed, consisting chiefly of quartzites and comparatively large boulders of a creamy white quartz. There were also a few large and round nodules of flint present, the origin of which is doubtful, but they have probably been brought there by human agency.

As to the age of this clay, the evidences are by no means clear, but from what I saw subsequently in my journey, I am inclined to think that this beach clay may be the boulder clay of the district. The comparative absence of boulders from this

part of the beach may be accounted for by the slight amount of denudation to which the clay has been subjected at this point. I regret that I had not time to re-examine this ground on my return journey.

Bay of Shoals.—After rounding the Bluff in the Bay of Shoals the cliffs become low and uniform, composed of a reddish clay covered with travertine. A range of low hills runs parallel with the coast at half a mile distance, and, from appearances, are capped with travertine limestone. The north side of the Bay is destitute of cliffs, the shore line being composed of sand intermixed with patches of travertine that rises gently from the water-level. No distinct evidences of glacial action were observed within the limits of the Bay of Shoals.

Salt Lagoon.—The first indisputable proofs of glacial action were met with some distance inland from the head of the Bay of Shoals. Deviating from the coast at Salt Creek, I went three miles in a south-west direction, and visited Salt Lagoon in Section 63, Hundred of Menzies. The Lagoon (which must be distinguished from a larger "Salt Lagoon," situated about two miles to the north-east) is a sunken area, not quite half a mile in length, and in summer is dry and incrusted with salt.

On the western side of the Lagoon, in clay ground, I found numerous travelled stones, some of large size. Sixteen good-sized granite boulders, besides numerous quartzites, were counted within a short distance of the lake. The eastern and southern boundaries of the lake consist of travertine ridges, but on the top of the rise on the south side there is a conspicuous dark-coloured and very siliceous quartzite boulder, which has been much flaked, whether by human agency or not is difficult to say. The boulder clay at this point has a trend northwards, following the base of Rettie's Bluff, a very prominent basaltic escarpment of the Gap Hills.

Returning to the Bay of Shoals, the northern shores were followed to Point Marsden. In this locality the geological features are entirely obscured by sand and travertine, and little of interest was met with till Point Marsden was reached, at the extremity of the north-west peninsula of Kangaroo Island.

Point Marsden to Smith's Bay.—Near the Point a very remarkable sandstone (to be referred to presently), occupies the coast line, and continues for many miles in a westerly direction, making travelling by the beach difficult and wearying. A few erratics can be seen lodged between the serrated outcrops of the sandstone near Point Marsden, but are much more numerous a little further to the west.

The cliffs along this part of the coast, whilst attaining a considerable altitude, are very disappointing, being capped with

travertine limestone, which is often several yards in thickness, and rests upon limestone rubble and marls. The travertine material has, in most cases, fallen on the lower face of the cliffs, forming a talus, overgrown with scrubby vegetation, entirely obscuring the beds that may be beneath the calcareous cap; but there can be little doubt that the glacial beds underlie much of the travertine of the north coast, as the retreating cliffs have left a great number of large erratics strewn along the beach, in varying numbers, as far as my observation extended westwards.

In a little bay, about three-quarters of a mile on the western side of Point Marsden, where the sandstone outcrop is partially interrupted by a sandy beach, there is a remarkable assemblage of these ice-travelled stones. It was not difficult at this point to stand in one position and count 20 large granite boulders within easy sight. In a closely connected group were the following:— A rounded mass of pink granite, 4 ft. by 2 ft. 6 in., split in two; a similar rock close by, 2 ft. by 1 ft.; grey granite, 3 ft. by 1 ft. 9 in.; pink granite, 2 ft. 6 in. by 1 ft. 7 in.; grey granite, 2 ft. by 1 ft. On the seaward side of this group was an immense block of pinkish granite, which had been broken into several pieces, but which originally had measured 12 ft. by 6 ft. In addition to the granite boulders, there were travelled stones of various kinds, quartzites being in equal numbers with the granites.

After rounding White Point, the extreme roughness of the coast, together with the excessive heat, compelled me to climb the cliffs and make my way through the scrub until Emu Bay was reached. Emu Bay may be said to be one of the finest stretches of hard sand, with deep water close in, to be found in the colony. It is three miles in extent, and contains a few boulders, particularly on its western side. Near Mr. Bates' farmstead, which is close to the beach, there is a bank of shingle that exhibits a great variety of stones, including rolled pebbles of the breccia beds described below. Erratics, some of which are of considerable size, can be seen scattered over the paddocks following the valley of the Emu Bay Creek, through Mr. Snelling's farm, and extending southwards, beyond the main road from Queenscliffe, forming a continuous stretch of boulder clay from Emu Bay to Rettie's Bluff and Salt Lagoon, already referred to, a distance of eight miles. Some fine examples of granite boulders occur in Mr. Mitchell's paddocks, near the head waters of the Emu Bay Creek.

Smith's Bay.—From Emu Bay to Smith's Bay the coast is rugged, with high cliffs of sandstone. On the eastern side of Smith's Bay there is an excellent section of boulder clay (see Plate IV). It is overlain by a thick formation of travertine-limestone and rubble,

and rests unconformably on the eroded edges of dark-coloured friable shales of the Point Marsden series. Numerous erratics occur on the beach, and are seen in situ in the clay. One of these, consisting of sandstone, is seen projecting from the boulder clay about halfway up the cliff, which measured 7 ft. by 6 ft., and 3 ft. thick. This fine tabular mass is markedly striated and polished on its upper surface. From this point, to the extent of half a mile, the boulders strew the beach in all directions. Two granite boulders gave the respective measurements of 5 ft. by 3 ft. 9 in., by 2 ft. 6 in. high, and 7 ft. 6 in. by 4 ft. 6 in. A large quartzite measured 7 ft. 9 in. by 5 ft. 3 in., and another, nearly even with the sand, was 10 ft. 6 in. in its longer axis. The boulder clay at Smith's Bay goes inland in a southernly and south-easternly direction, skirting the flanks of the range known as the Gap Hills; it passes through the gap in the range, and expands in a southernly direction as far as Sections 272 and 273.

On the land farmed by Mr. John Turner, the Clerk of the District Council, situated within half a mile from the sea at Smith's Bay, the boulders are so thick that they have had to be removed from the ploughed land before it could be cultivated. One of these was a large tabular quartzite, 4 ft. 6 in. by 3 ft., and 2 ft. 6 in. high, which required, as stated by Mr. Turner, a team of six bullocks to draw. Most of these erratics strewn over the land are beautifully faceted, polished, and striated by ice action.

On the eastern side of the Bay, the creeks which run at the back of the coastal range of hills, as well as the adjoining paddocks on the Queenscliffe main road, are covered with glacial drift, and in places the ground is simply a gravel bed of these transported stones. Extensive patches have been bared of vegetation by the presence of mineral springs, as well as wash from rains, so that the included stones of the boulder clay can be studied in this locality with great advantage. Dark-coloured siliceous quartzites (many of them banded) are much in evidence. Several varieties of pink and grey granites are common, some of which are extremely coarse in texture, whilst others are microcrystalline. Amongst other varieties were noticed: gneiss, hornblendic, and schistose rocks. Some of the granites closely resembled the granitoid rocks of the Port Victor district, whilst others did not. A careful study of the lithology of these boulders might supply a clue to the source from which they have come, as this locality is particularly favourable for such investigations, the travelled stones being in great variety and well exposed.

The boulder clay rises to the flanks of the Gap Hills to the south of Smith's Bay, but I was unable to find any place where the glacial clay could be seen in stratigraphical relationship with

the basalt. The talus formed by this much-jointed igneous rock is very extensive, and for the most part has covered both the white sandstone outcrop and the adjacent boulder clay. The probabilities, however, seem to be that the boulder clay underlies the white sandstone, and consequently the basaltic cap also.

The white sandstone, which is inferior to the basalt throughout the district, Mr. Brown considers the equivalent of the sandstone of the Inman Valley, with which it has a close resemblance. As the sandstones of the Hindmarsh, Inman, and Yankalilla districts sometimes carries glaciated erratics, there can be no doubt that it belongs to the same series as the underlying boulder clay of the neighbourhood. I saw no erratics in the sandstone on Kangaroo Island, but the analogy in other respects seems to point to its being the upper member of the glacial beds on Kangaroo Island as it is on the mainland.*

In defining the contour of the boulder clay in its landward extension on the south side of the Gap Hills, I am much indebted to the extensive local knowledge of Mr. John Turner, who assisted me in marking off its limits on the map (Plate V.), but the lines of occurrence must be taken as approximate only.

So far as I saw the country, I am led to think that it is the occurrence of the glacial clay at the surface which forms the very productive cultivable land met with on the Island, but which, it is to be regretted, forms but limited patches between extensive stretches of unproductive limestone and sandy country.

Only in one instance did I observe the Glacial Till in direct contact with the bed rock, and then it was resting on soft shales that were unfavourable for the preservation of glacial features.

The glacial remains described in this paper extend in a straight line 12 miles from east to west, and seven miles in a north and south direction, and greatly enlarges the area previously known to have been under glacial conditions in South Australia. The extinct ice field may now be described as extending over 70 miles from Smith's Bay, Kangaroo Island, on the west, to Hindmarsh River on the east, and not less than 40 miles in a north and south direction from Kangaroo Island to Hallet's Cove on the mainland. There is the highest probability that further research will show that the ice action has been much more extended than the area now described, although the general prevalence of sand and travertine over the lower portions of the Island greatly masks the underlying strata in positions where the glacial beds are most likely to occur.

* A similar white sandstone is seen at Hallet's Cove, where it overlies the boulder clay, and separates the latter (within the limits of the amphitheatre) from the overlying fossiliferous Miocene limestone. The line of unction between the sandstone and Miocene beds exhibits numerous erratics.

Palæozoic.

As already stated, a very remarkable sandstone occupies the coastline extending westerly from Point Marsden to an unknown distance on the west side of Smith's Bay, and is different from any other formation that I have seen in the colony. Mr. H. Y. L. Brown, Government Geologist, who visited the district a few weeks earlier than myself, has described the peculiar features of this formation in a report recently published. It is a comparatively soft, laminated, reddish-coloured sandstone, frequently exhibiting mica on the planes of stratification, and is false-bedded as well as contorted in places. It weathers easily under the action of the sea, and is frequently converted by this process into a honeycombed rock. At some horizons the sandstone is of a sub-argillaceous character, and exhibits a tesselated system of jointing, marked by double raised ridges surrounding each square, as is sometimes seen in deposits of clay-iron ore.

At Emu Bay and on the east side of Smith's Bay there are thick beds of dark-coloured laminated shale.

At Point Marsden, and for some distance in a westerly direction, the dip is 15° north-east. At White Point the dip has increased to 45° in the same direction. On the east side of Emu Bay the dip is reversed at 15° to south-west, and on the west side of the same Bay the dip is once more to the east and east-south-east at about the same angle. At Smith's Bay the dip once more varies from north-west to north-north-east.

The most striking feature of this formation is the presence of a number of beds of Breccia, which are intercalated with the sandstones near the highest exposed beds of the series. These Breccia-beds are somewhat irregular, varying much in thickness within short distances; they are roughly lenticular in section, and do not in any case exceed a maximum thickness of six feet. The included fragments vary in size from coarse grit up to blocks two feet in length, although stones of the latter size are very rare. The fragments are almost without exception sharply angular.

The contents of these Breccia-beds are extremely varied. Amongst the commonest occurrences were observed a pink-colored felspathic gneiss, various granitoid rocks, buff and grey limestones, quartzites, jasperous and other varieties of quartz, and, more rarely, micaceous and hornblendic schists. The cementing agents seem to be principally calcareous or colloid silica (chalcedony). This great diversity of mineral character seems to point to the fact that the included stones of these Breccia-beds were gathered from a variety of sources, and the presence of a large number of limestone fragments is proof that the transport-

ing agent must have travelled over a limestone country in one part of its course.

The following is a section, in descending order, at Point Marsden, where the Breccia-beds occur, the thickness of these beds are reckoned at their maximum.

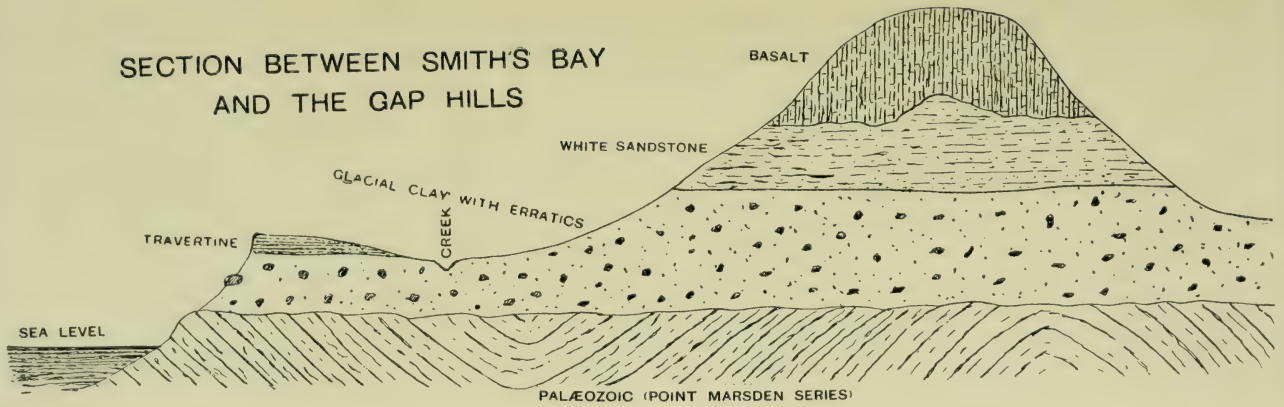
Section of Breccia-beds at Point Marsden.

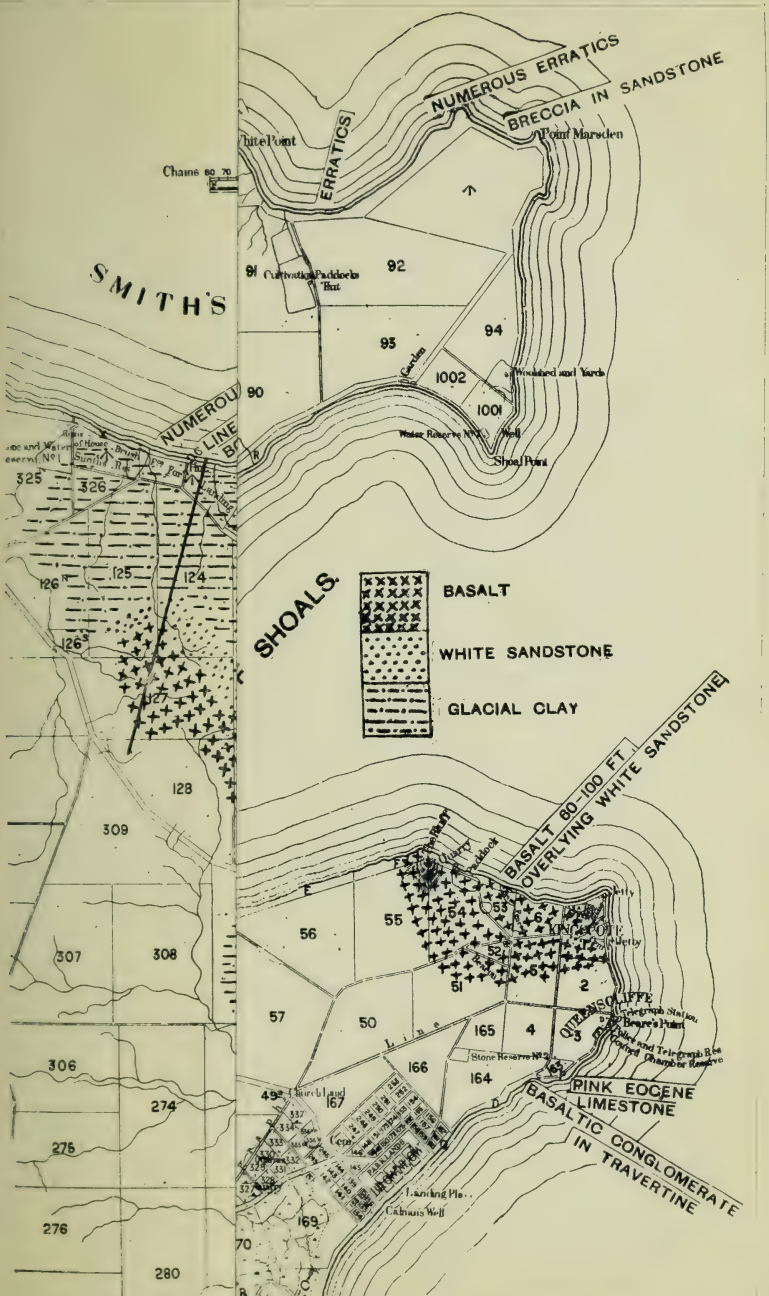
Overlying sandstone: thickness unknown.

	Ft.	in.
1. *Breccia*	4	0
Sandstone—central portion, from 1 to 1½ft., hard rock	4	0
2. *Breccia*	2	0
Sandstone band	0	6
3. *Breccia*	5	0
Flaggy sandstone	6	0
4. *Breccia.* Increases rapidly from 1 ft. to	3	0
Sandstone in thin flags	1	6
5. *Breccia*	6	0
Sandstone	8	0
6. *Breccia*	4	0
Sandstone	15	0
7. *Breccia*	2	0
Thick sandstones.		
At *White Point*, a distance of rather more than a mile from the above section, another Breccia (No. 8) occurs.		
8. *Breccia*	4	0
Thick sandstones and shales.		

The total thickness of these Breccia-beds is about 30 feet. They are very sharply defined in their stratigraphical junction with the overlying and underlying beds. There is no commingling of material, except an occasional erratic enclosed in the stratified sandstone, generally within a few feet of the Breccia-beds.

The origin of these remarkable beds is difficult to determine. Although no indication of glaciation could be detected on the included fragments, it is difficult to refer these confused assemblages of rock fragments to any other agent than ice. The evidences which favour this conclusion are (1) The beds are unstratified; (2) the fragments are angular; (3) the lithological characteristics of the rocks are extremely varied; (4) the isolated erratics which occur in the sandstone may also be best explained by such a supposition. It may be that these Breccia-beds represent a terminal moraine with the foot of the glacier alternately advancing and retreating, which would account for these Breccias being irregularly interstratified with the sandstone layers. On the other hand it is remarkable that the included fragments are so limited in size. This feature might point to the agency of shore


SECTION BETWEEN SMITH'S BAY
AND THE GAP HILLS
BASALT
WHITE SANDSTONE
GLACIAL CLAY WITH ERRATICS
CREEK
TRAVERTINE
SEA LEVEL
PALÆOZOIC (POINT MARSDEN SERIES)


NUMEROUS ERRATICS
BRECCIA IN SANDSTONE
ERRATICS
Point Marsden
Chains 60 70
SMITH'S
Cultivation Paddocks Hut
Garden
Woolshed and Yards
Water Reserve No 2
Well
Shoal Point
SHOALS.
BASALT
WHITE SANDSTONE
GLACIAL CLAY
BASALT 60-100 FT.
OVERLYING WHITE SANDSTONE
Quarry
Paddock
Jetty
Telegraph Station
Beare's Point
Stone Reserve No 2
Church Land
Landing Place
Calnans Well
PINK EOCENE
LIMESTONE
BASALTIC CONGLOMERATE
IN TRAVERTINE
Line
91
92
93
94
90
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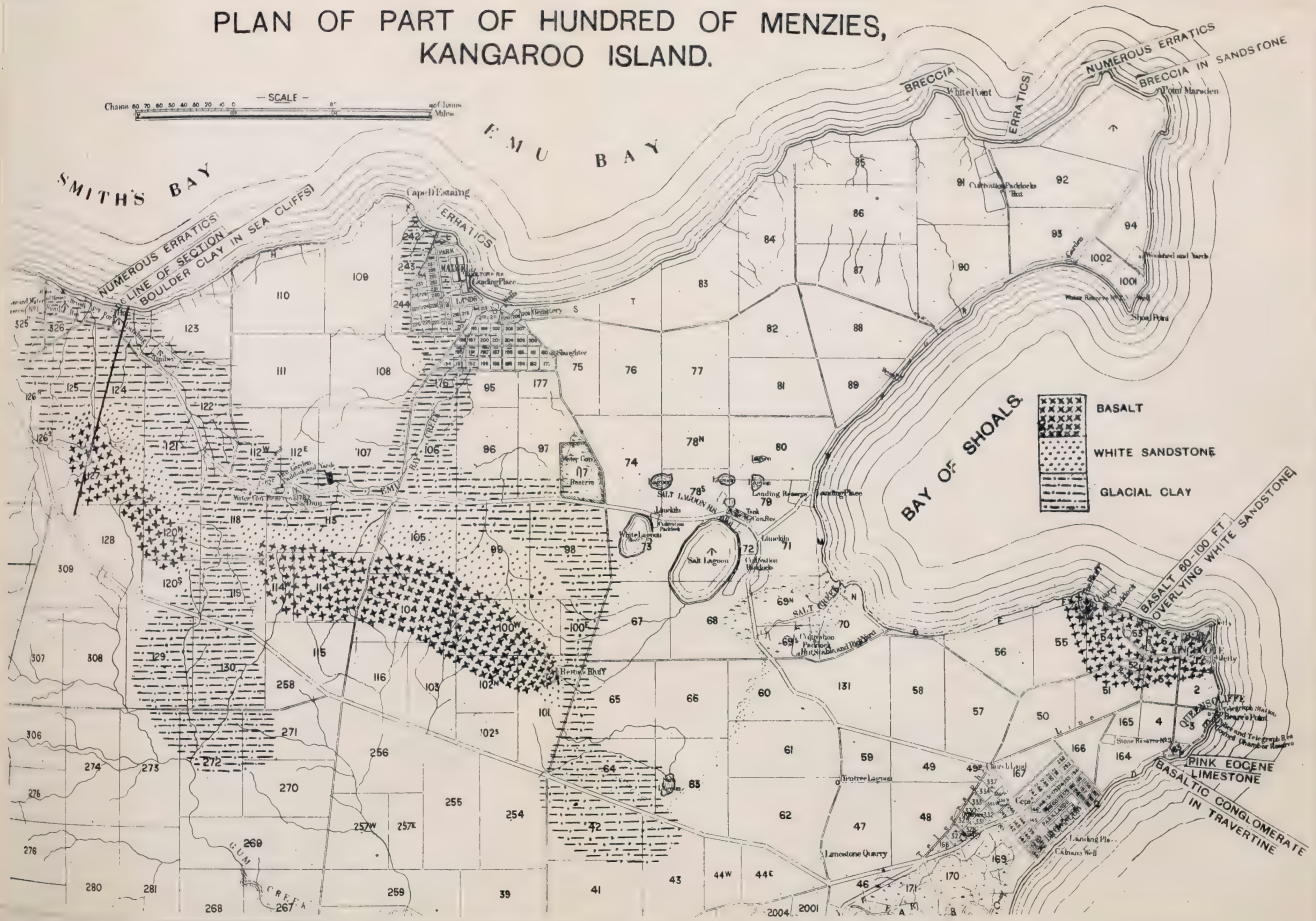
PLAN OF PART OF HUNDRED OF MENZIES, KANGAROO ISLAND.



ice of no great thickness, and therefore incapable of transporting stones of large size. These suggestions are only thrown out as possible causes for the peculiar features of these beds rather than any settled conviction as to their origin.

The geological age of this formation is doubtful. It does not appear to have been subjected to the metamorphic action that has converted the sandstones of the Mount Lofty Ranges into quartzites. It is free from vein quartz, which is a general feature of the latter, as well as being more friable. The derived limestones in the Breccia-beds are crypto-crystalline, and resemble some of the Cambrian marbles, but no fossils have been detected in them.

If the Breccia-beds are genuinely glacial in their origin, they are certainly much older than the glacial clays and erratics more particularly described in this paper, for the following reasons :—

1. No erratics at all comparable in size to those scattered over the surface occur in the Breccia-beds. The size of the stones in the latter seldom exceeded a foot in diameter.

2. Whilst some of the glacial erratics rested on the eroded edges of the sandstone and Breccias, there is no lithological similarity between the superficial erratics and the fragments which make up the Breccias.

3. At several points the boulder clay is seen to rest unconformably on the eroded edges of the Point Marsden series.

Judging from the general appearance of the sandstone, together with the occurrence of derived (?) Cambrian limestones in its Breccias, I am disposed to regard it as belonging to one of the middle or upper Palæozoic periods. The shale beds that are included in the series might be carefully searched for fossils with some hope of success. Great interest attaches to the westward extension of these beds, as their junction with the older rocks will probably be found in that direction, and might show an unconformability.

Notes upon some Fossil Reptilian Remains from the Warburton River, near Lake Eyre.

By A. Zietz, F.L.S., C.M.Z.S., &c., Assistant Director of the S.A. Museum.

[Read September 5, 1899.]

In the year 1859 Prof. R. Owen described and figured some fossils in the Phil. Trans. of the Royal Society, London, vol. CXLIX., consisting of three vertebræ of a gigantic land lizard from the (Pleistocene?) deposits forming the bed of a tributary of the Condamine River, West of Moreton Bay, and named it *Megalania prisca*. In his description he points out its close relationship to the recent Varanidæ. For comparison with the fossils, figures are also given of the vertebræ of the *Varanus giganteus* from Central Australia.

In a second paper by the same author, which appeared in 1880, "dorsal," "sacral" and caudal vertebræ, a skull* and a fragment of the same are figured and described.

In the Proceedings of the Royal Society, London, 1886, Prof. R. Owen described and figured the sacrum and foot-bones, which, however, are stated by A. S. Woodward, Ann Mag. Nat. History, 1886, to be those of some large Marsupial. †

In 1888, A. S. Woodward, in a paper "On the Extinct Reptilian Genera *Megalania* (Owen) and *Meiolania* (Owen)," gives a summary of previous observations, and proposes the new name *Meiolania Oweni*‡ for a Chelonian, which name has also been adopted by Lydekker in the Catalogue of Fossil Reptilia, &c., in the British Museum.

Woodward further states—"It appears that under *Megalania prisca* have been included (1) Lacertilian vertebræ and an occipital fragment, (2) Chelonian skull and tail-sheath, (3) Marsupial foot-bones."

The first necessarily form the type specimens of the genus and species, and the last are obviously at once excluded from consideration.

In the S.A. Government Geologist's Report for 1894, in a supplementary paper by Mr. R. Etheridge, junr., Palæontologist

* A. S. Woodward states this skull to belong to a Chelonian.

† Diprotodon (A. Z.).

‡ See British Museum Catalogue of Fossil Reptilia, &c., Part III., p. 166.

in the Australian Museum, Sydney, "On the Occurrence of Megalania (Owen) (sensu stricto) in South Australia," two vertebræ are figured and described: Plate I., figs. 1, 2, 3, and Plate II., figs. 1, 2. The first is stated to be "a dorsal vertebra, probably from an immature individual, &c. It appears to correspond well with the dorsal vertebræ figured by the late Sir R. Owen, F.R.S., in his first paper on Megalania." This is undoubtedly a true Varanus vertebra.

Plate II. figs. 1-2. represent a vertebra which is described as "one of the lumbar series, very much larger than the dorsal." This vertebra, however, does not belong to *Megalania*, but is a true Crocodilian vertebra, and evidently belongs to the same species of crocodile, of which three vertebræ have have previously received by the S.A. Museum from Messrs. W. R. Cave & Co., in 1888.

These were obtained with the following fossils from the bed of the Warburton River, near Lake Eyre; probably from the same locality where Mr. Brown obtained his specimens. Fragments of lower jaw of Nototherium, fragments of Diprotodon bones, fragments of Kangaroo bones, dorsal vertebra of *Varanus* (*Megalania*) *priscus*, tail vertebra, unguinal phalanx, phalanx, three vertebræ, fragments of dermal scutae of Crocodile, fragments of carapace and plastron of two Chelonian species, *Chelodina insculpta*, De Vis, and *Chelymys uberrima*, De Vis, and fragments of skull of a Siluroid fish.

All these bones are more or less petrified: and judging from their appearance and their fragmentary and often water-worn condition, seem to have been washed out of the sand and clay banks by floods, as already stated by Mr. Brown in his report of 1894.

The deposit, from which these fossils originate, was not found by him, although he travelled about 50 miles up the river.

Lydekker, in the Catalogue of Fossil Reptilia in the British Museum, vol. I., page 284, points out the close relationship of *Varanus (Megalania) priscus* (Owen) to an extinct Indian species *(Varanus sivalensis)*. This species, as well as *V. priscus*, compared with our recent forms, owns proportionally shorter and stouter-built vertebræ than the latter. Owen says in his paper, "The chief peculiarity of the Australian fossil Lizard is its great size; the vertebræ rival in bulk those of the largest living crocodiles. Its estimated length was about 20 feet."

The vertebræ have already been figured, but not the phalanx, the unguinal phalanx (which measures over two inches in length), and which, as it appears to me, have not been found before.

The unguinal phalanx agrees very well, excepting its enormous size, with the corresponding one of *Varanus giganteus*, the "Perentie," which is stated to attain a total length of eight feet.

Judging from the much smaller size of the Warburton River fossils in comparison with those from the Condamine River deposits, they appear to belong to a much smaller and hitherto undescribed species, for which I propose the name VARANUS WARBURTONENSIS.

In the following table measurements are given of one of the two vertebræ under consideration, and also one of those described by Prof. Owen from the Condamine River, Queensland.

	Condamine R.		*Warburton R.*	
	In.	Lines.	In.	Lines.
Length of centrum	3	3	2	4
Length of non-articular lower surface of centrum	2	0	1	4
Breadth of centrum, behind the ball ...	1	11	1	2
Vertical diameter of centrum behind the ball	1	4	0	9
Vertical diameter of cup	1	9	1	2
Transverse diameter of cup	2	5	1	6
Breadth of neural arch above the costal tubercles	4	7	2	6
Vertical diameter from highest part of neural arch	3	4	2	3
Transverse diameter of anterior outlet of neural canal	0	9	0	6
Transverse diameter of posterior outlet of neural canal	0	4	0	3
Vertical diameter of anterior outlet of neural canal	0	3	0	4
Vertical diameter of posterior outlet of neural canal	0	5	0	5
Longest diameter of anterior zygopophysis	1	6	0	11
Vertical diameter of costal tubercle ...	1	0	0	7
Transverse diameter of costal tubercle ...	0	7	0	6
Antero-posterior extent of base of neuropophysis	1	10	1	2

Notes on Melonite (Nickel-telluride) from Worturpa, South Australia.

By Alfred J. Higgin, Lecturer on Chemistry, University of Adelaide.

[Read September 5, 1899.]

Three separate samples of the telluride lately found at Worturpa were sent to me, all of which I found to be identical in appearance. The telluride occurs with quartz and calcite in thin lamellæ, hut not showing distinct crystalline form.

It has a brilliant metallic lustre. The colour of the cleavage planes by direct reflection is silver-white; in oblique directions, reddish-brown; on the fractured faces of a more bronze-like hue. The hardness is 1·5; sp. gr., 7·6; streak lead-grey. A qualitative analysis proved that the mineral was telluride of nickel, containing traces of bismuth and lead, and a variable quantity of free gold.

A quantitative analysis of the mineral gave the following results:—

	(1) Per cent.	(2) Per cent.
Insoluble matter	2·091	7·319
Gold	·329	·018
Nickel	22·99	21·274
Tellurium	74·49	71·500
	99·90	100·111

The material for analysis was picked out when the stone had been broken up, and is, as will be seen, nearly free from foreign matter. There can be no doubt from these analyses that the mineral is melonite, $Ni_2 Te_3$. This would require—

	Per cent.
Nickel	23·51
Tellurium	76·49
	100·00

This mineral has, so far as I am able to ascertain, only been found in one place, viz., in the Stanislaus mine, California, U.S. of America.

It is described by Genth in a paper entitled "Contributions to Mineralogy," published in the American Journal of Science, vol. XLV., 1868. Geuth states that he only obtained a small

amount of the mineral, and then it was not pure, but mixed with quartz and small quantities of Hessite, Altaite, and, possibly, Native Tellurium.

The mineral has, he states, a metallic lustre, and is of reddish-white colour, similar to bismuth. He observed one microscopic but perfect six-sided plate, but states that the largest portion was in indistinct granular and foliated particles with eminent basal cleavage. This description does not quite agree with the appearance of the mineral from Worturpa, but probably the latter is purer than that examined by Geuth.

In some places the telluride of nickel from Worturpa has undergone oxidation, staining the surrounding matrix either green or yellow. There was not sufficient of the oxidation product present to enable me to determine its composition. But it is probably tellurite of nickel.

I examined several portions of the mineral in order to ascertain whether the gold was present in the free state or combined with tellurium. On dissolving the mineral in nitric acid, even when very dilute acid was used, the gold was always obtained in bright spangles, sometimes of considerable size, but even the smallest particles showed, when examined under the microscope, a bright shining surface.

Though the gold occurs in the free state in all the samples submitted to me, it is highly probable that it was in combination with Tellurium, and that the Telluride of gold has undergone decomposition.

It would be of interest to examine samples of the mineral obtained from a greater depth in the lode, where there could be no possibility of oxidation occurring.

All the samples were examined for Selenium and Cobalt, but none was found present.

A Revision of the Australian Cyclostrematidæ and Liotiidæ.

By Professor Ralph Tate.

[Read September 5, 1899.]

Plates VI., VII.

This communication was submitted to this Society, August 2, 1898, but by reason of inability to prepare illustrations in time for issue in the volume for 1898, its publication was deferred. A brief abstract appears, however, on p. 239 of that volume, and therein is established the generic names *Cyclostremella* and *Pseudoliotia*. In the interval some additional information has been collected or published, notably the illustrations of *Liotia Lodderæ* by Mr. Hedley, and that five speeies of *Cyclostrema* and one of *Liotia* have been elaborated by Dr. Verco, the diagnoses of which, and accompanying illustrations in a published form, are deferred till his return from Europe; also, my attention has been drawn by Mr. Hedley to a paper by Miss Bush on "A Revision of *Cyclostrema* and Related Genera belonging to the Atlantic Fauna of America" (Trans. Connecticut Acad., 1897), wherein a new genus *Cyclostremella* is founded, which necessitates a new name for the genus typefied by *Liotia Lodderæ*.

The limits of the genera *Cyclostrema* and *Liotia* are not so exact as to permit in all cases of a safe reference to one or the other.

The conchological characters largely relied on for *Cyclostrema* are a thin vitreous test, entire, simple non-varicosed aperture, and a multispiral operculum. For *Liotia*, a stout perlaceous test, last whorl descending at the front, aperture varieed and entire, operculum spiral and covered with calcareous granules. As to the animal, that of *Liotia* is only known, and to the following extent: "does not possess intertentacular lobes, but the foot is furnished with lateral filaments, as in Trochidæ" (A. Adams, in P.Z.S., 1863).

As a result of a study of the larger number of Australian species embraced in the families Cyclostrematidæ and Liotiidæ, I find that several species have been wrongly assigned to their respective families. Thus, for instance, *Cyclostrema micans* and *Liotia Angasi* have solid shells, with an entire aperture, but not distinctly varicosed; by comparison of types in the British Museum, they are one and the same species, and as the test is

not pearly inside the family reference should be to *Cyclostrematidæ*, a position confirmed by my personal knowledge of its operculum. Another species of dubious generic location is *Liotia Loddericæ*, which, because of its thickened aperture, has a Liotia-like aspect; but its vitreous test, in the absence of other characters, makes it desirable to relegate it also to *Cyclostrematidæ*.

Having applied the above-mentioned conchological tests to many of our reputed species of these two families, I hope that my verdicts thereon may facilitate the preparation of a complete revision of them.

FAMILY CYCLOSTREMATIDÆ.

Cyclostrema is a heterogeneous assemblage of species, embracing such divergent characters as—

1. TEXTURE—*a*, porcellonous and thick, as in *C. micans*; *b*, translucent and thin, as in *C. Tatei*.
2. SHAPE—*a*, turbinate, as *C. tenera*, Jeffreys, and *C. conica*, Watson; *b*, discoid, as *C. nivea*, A. Ad.; *c*, planorbiform, as *C. cyclotina*, A. Ad.
3. APERTURE—*a*, simple, as in *C. Tatei*; *b*, thickened, as in *C. micans*; *c*, varicosely margined, as in *C. Loddericæ*.
4. UMBILICUS—*a*, wide in *C. Tatei*; *b*, almost obliterated in *C. micans*.
5. PERITREME continuous or incomplete.

These multifarious elements indicate that *Cyclostrema*, in an extended sense, is heterogeneously composed, and in my treatment of the Australian species I have endeavoured to arrange them in genera and sections best in accord with morphological characteristics—anatomical features still remain unascertained; nevertheless, I have added difficulties by the inclusion of three species of doubtful classificatory position.

GENUS CYCLOSTREMA, *Marryatt*, 1818.

Shell depressed; test thin, hyaline, usually spirally lined or ridged; aperture simple; umbilicus open.

The genus *Vitrinella*, C. B. Adams, does not appear to me to be distinct from the typical Cyclostrematids.

SECTION CYCLOSTREMA, *s. s.*

The characters of the genus.

SECTION TUBIOLA, *A. Adams*, 1864.

Shell turbinate; thin, opaque-white, and usually inornate.

The genus *Cirsonella*, Angas, which was placed provisionally by its author among Trochidæ, is, in my opinion, reducible to this section. Fischer, Man. Conch., and Tryon, Man. Conch., X., p. 16, place it subgenerically under *Tinostoma*. *Tinostoma* is not considered by me a member of the family.

Genus Lodderia, *Tate*, 1899.

Differs from *Cyclostrema*, *s. s.*, by its varicosely margined aperture. Type: *Liotia Loddercæ*, Petterd.

Genus Pseudoliotia, *Tate*, 1898.

Shell somewhat like *Liotia;* test thick and porcellanous; aperture oblique to the axis, its margin thickened; umbilicus reduced to a mere chink; operculum horny, multispiral. Type: *Cyclostrema micans*, A. Adams; it recalls *Mölleria*, which is differentiated by a calcareous operculum. Judging from published figure and description, *Cyclostrema eburnea*, Nevill, is congeneric.

CATALOGUE OF THE AUSTRALIAN CYCLOSTREMATIDÆ.

Genus Cyclostrema, *s. s.*

1. Cyclostrema Tatei, *Angas.* P.Z.S., 1878, p. 862, t. 54, fig. 10.

The ornamentation of the the shell of this species varies from eight spiral ribs to nearly smooth. The many keeled form resembles *C. cingulifera*, A. Adams, whilst the smooth form simulates *C. lævis*, Kiener. Reeve, in his Monograph of the genus records these Japanese species as also from Port Lincoln. My comparison of *C. Tatei* with the British Museum examples of *C. cingulifera* leaves me in doubt of their specific identity, chiefly on account of the very large size of the Japanese shells. Until Mr. Edgar Smith has given his opinion on the question, which he kindly promised to do, I shall expunge *C. cingulifera* and *C. lævis* from the South Australian fauna, as I tentatively regard Reeve's Australian reference to belong to *C. Tatei.*

The species is confined to St. Vincent Gulf, and the coast to the westward thereof. (*R. Tate*).

2. Cyclostrema Harriettæ, *Petterd.* Journ. Conch., p. 141 (1884).

This Tasmanian species, types of which I have had under comparison, is closely related to *C. Tatei*, but differs by its regularly disposed spiral threads, transversely and closely striated (not oblique and distant), depressed spire, and by the subtruncate periphery of the last whorl. Also Holdfast Bay, S. Australia (*R.T.*).

3. Cyclostrema Johnstoni, *Beddome.* Proc. Roy. Soc., Tasmania, for 1882, p. 168 (1883). Pl. vii., figs. 7 *a-b.*

A depressed shell, ornamented with sharp elevated transverse ribs (about 35 on body-whorl), intercostal spaces without sculpture; aperture entire, not thickened.

It is very like *C. Archeri*, Tryon. Man. X., p. 89, t. 33, fig. 84, 1888, but "peristome thickened" does not apply, though his figure does not portray that character. The species belongs to Tasmania.

Cyclostrema inscriptum, *spec. nov.* Pl. vii., figs. 3 *a-b*.

Shell minute, very fragile, discoidal, diaphanous, widely umbilicated. Spire flat, not rising above the plane of the last whorl. Whorls four, convex, with a gentle antesutural slope; surface smooth and shining, but incremental striæ are visible under a pocket-lense. Aperture roundly oval, a little wider than high; peristome incomplete.

Dimensions of figured example.—Major diameter, 2·2; minor diameter, 1·6; height, 1·2 mm.

Locality.—West coast of South Australia.

This species differs from the smooth form of *C. Tatei* by its flat spire, the last whorl relatively less high, and by the absence of spiral ornament; it has not the compact build or sunken spire of *C. charopa*.

Cyclostrema delectabile, *spec. nov.* Pl. vii., fig. 4.

Shell small, thin, translucent white, subdiscoidal. Spire slightly elevated; widely and perspectively umbilicated. Protoconch globulose and hyaline. Ordinary whorls three, of rather rapid increase; ornamented by rounded spiral and axial threadlets, which on the antesutural slope are of about equal strength and equidistant, producing a reticulation of square meshes; on the rounded periphery the spiral riblets are dominant as far as the edge of the umbilical crater, but in its gentle slope the axial riblets reappear, and in greater strength than they are posteriorly Aperture orbicular; peristome thin and continuous.

Dimensions of figured example.—Major diameter, 1·66; minor diameter, 1·1; height, ·95 mm.

Locality.—Fowler Bay, west coast of South Australia; collected by me in 1879.

Reticulated sculpture is rare in the family, and the peculiarity of its partial development in the present species is in itself a sufficiently distinctive character.

Doubtful Species of Cyclostrema.

Cyclostrema caperatum, *spec. nov.* Pl. vii., figs. 1 *a-b*.

Shell small, discoidal; diaphanous, though somewhat clouded around the umbilicus. Spire convex, slightly elevated; whorls four and a-half, inclusive of protoconch of one and a-half smooth whorls. The ordinary whorls slightly depressed at the posterior suture thence regularly subconvex, suture linear; all the whorls spirally lined, the linear ridges slightly narrower than the inter-

vening sulci about fourteen on the upper-surface of the body-whorl; the posterior one and a-half whorls ornamented by arched retroverted transverse folds, the last whorl abruptly rounded at the periphery to the flattened base, which is inconspicuously marked by concentric lineations.

Aperture roundly oval, a little wider than high, its vertical plane oblique to the axis of the shell; peristome incomplete; outer lip acute and medially ecurved; columellar lip nearly vertical, with truncated edge, and thickened at its junction with the basal lip. Umbilical orifice of moderate size, but exposing the penultimate whorl; umbilical crater with somewhat precipitous sides interrupted by a shallow spiral furrow.

Maximum diameter, 5; height, 2 mm.

Lakes Entrance Gippsland, Victoria, in shell-sand. Three examples collected by, and received from, Dr. Pulleine.

I am not satisfied that this new species is rightly placed in *Cyclostrema* or even in Cyclostrematidæ; the oblique aperture is not proper to *Cyclostrema*, whilst the spiral excavation around the umbilical crater, which recalls *Minolia* in Trochidæ and *Homalaxis* in Solariidæ (at least as represented by the species in the Parisian Eocene) is not known among Cyclostrematidæ. But I am at a loss where else to place it in the absence of characters which would be furnished by the animal or its operculum.

Supplemental Note.—The following extract from a letter (25/9/99) by Mr. C. Hedley, is of much interest regarding the systematic position of this species:—"Your *C. caperatum* I refer to the section *Solariorbis* of *Teinostoma*. The group is defined by Dall; briefly it is distinguished by an umbilical keel. The nearest ally of *caperatum* is *Starkeyæ*, N.S. Wales. A glance at the umbilicus serves to distinguish them, that of the latter being more choked by the umbilical keel; besides *caperatum* is striated; *Starkeyæ* smooth; *caperatum* absolutely larger and comparatively flatter."

Cyclostrema charopa, *spec. nov.* Pl. vii., figs. 2*a*-2*c*.

Cyclostrema micra, Petterd, Journ. Conch., p. 139, 1884 (non *C. micra*, Ten.-Woods, 1877).

Shell minute, planorbiform, very widely umbilicated, sordid-white; spire slightly sunken. Whorls four, rapidly increasing, convex; last whorl with a sloping sutural margin; the ornament consists of close-set, slender, oblique growth-lines only; base convex, abruptly bounding the wide umbilicus, which exposes all the whorls. Aperture incomplete, nearly circular, a little wider than high; outer lip sharp, ecurved medially.

Dimensions of figured specimen.—Minor diameter, 1·1; major diameter, 1·84; height, ·5 mm.

Habitat.—Tasmania (Petterd); South Australia (Dr. Verco).

The figured example, which I received from Mr. May, has been critically compared by me with Mr. Petterd's type, and is considered to be conspecific, though it is larger, and has an additional whorl, which has developed the sutural slope absent in the younger shell. This may not be a *Cyclostrema*, and I have been inclined to refer it to *Homalogyra*, but the simple aperture forbids such an attachment. The specific name is in allusion to the similitude of the shell to that of some species of the helicoid genus *Charopa*.

Cyclostrema Mayii, *spec. nov.* Pl. vi., figs. 4*a*-4*c*.

Shell minute, very fragile, discoidal, with a flat spire and rounded periphery, profundly and widely umbilicated. Protoconch large, oblong, and inflated. Spire-whorls two, slightly sloping to the channeled suture; ornamented by thick and somewhat irregular growth-folds, those on the body-whorl passing across the periphery to the umbilicus; the rounded periphery is faintly angled above and below, less so below than above. Aperture circular, peristome entire and simple.

Dimensions of figured example.—Major diameter, 1·1; minor diameter, ·84, height, ·4 mm.

Habitat.—Tasmania, received from Mr. W. L. May, of Sandford, in honour of whom I have employed the species-name.

This is another *Homalogyra*-like shell, but distinct from *C. charopa* in its flat, not sunken spire, coarse ornament, and complete peristome.

Section Tubiola.

Cyclostrema Angeli, *T.-Woods, sp.*

Rissoa (?) Angeli, Tenison-Woods, Proc. Roy. Soc., Tasmania, for 1876, p. 153 (1877); *id.*, *op. cit.*, p. 122, 1878.

This species seems congeneric with *C. conica*, Watson, "Voy. Challenger," of which Tryon remarks, "it is more like a *Scalaria*." Of Tenison-Woods' species, the same author says, "generic position doubtful;" though Tenison-Woods himself remarks, *op. cit.*, p. 122, "some authors would place the species in the genus *Cyclostrema*."

Habitat.—Tasmania (Blackman's Bay, ?type), my collection received from Mr. May; S. Australia, Dr. Verco.

Though Rissoia-like, yet by its fragile test, and in the absence of the opercular characters, it is better placed in Cyclostrematidæ, because of the thinness of the test.

Tryon figures a Tasmanian shell as *Rissoa Angeli*, but it is a distinct species, hereafter to be described.

The axial ornament of *R. Angeli* consists of thick ribs, about ten on the last whorl, which cease at the periphery. Ten-

Woods' observation, "outer lip thickened," is not correct, as that appearance arises from the coincidence of the thick rib making the apertural margin, which it does not always do.

Cyclostrema crebresculptum, *spec. nov.* Pl. vii., fig. 5.

Syn.—*Rissoa Angeli*, Tryon, IX., p. 358, t. 71, f. 11 (original), non Ten.-Woods.

Umbilicated, turbinate-conical, thin, sordid-white. Whorls four, convex, with a well-impressed suture; ornamented with sharp, slender, crowded axial threads (30 or more on the last whorl, which extend on to the base), and by numerous interstitial spiral striæ. On the base the spiral striæ are as strong as the axial threads. Aperture circular, outer lip thin.

Dimensions of figured example.—Major diameter, ·9; minor diameter, ·76; height, ·9 mm.

Habitat.—Tasmania (received from Mr. May).

This species is distinguishable from *C. Angeli* by more turbinate outline, and by its numerous slender axial threads, which extend on to the base; the sculpture recalls *C. Johnstoni*, which is, however, a discoidal shell. I do not regard it as an adolescent state of *C. Angeli*, because the posterior whorls (at any rate the penultimate one) have the type of costation as on the body-whorl.

Tryon's figure shows, and his description states, "sharp rather crowded growth-lines," which are at variance with Woods' statement that the ribs are thick and distant; characters borne out by the study of authenticated specimens of his species. I do not know the source whence Tryon obtained the several Tasmanian Cyclostrematids which he so unsatisfactorily figured, and seems not to have taken the pains to verify the application of the species names which accompanied them. There can be no hesitation for the opinion that in the present case he was misled into an error of identification.

Cyclostrema australe. * *Angas, sp.*

Cirsonella australis, *Angas*, P.Z.S., 1877, p. 38, f. 16.

Teinostoma (Cirsonella) australis, *Tryon*, Man. Conch. X., p. 107, t. 35, f. 83-84 (copied), 1888; *id.* Henn. and Brazier, P.L.S., IX., p. 175, 1894.

Cyclostrema Weldii, *Tenison-Woods*, Proc. Roy. Soc., Tasm. for 1876, p. 147 (1877).

Cyclostrema (Tubiola) Weldii, *Tryon, op. cit.*, t. 33, f. 11, p. 95 (original), 1888.

Cirsonella Weldii, *Brazier*, P.L.S., IX., p. 698, 1895.

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* Cyclostrema is a neuter noun.

Cyclostrema Susonis, *Tenison-Woods, op. cit.*, p. 147, 1877.

Cyclostrema (Tubiola) Susonis, *Tryon, op. cit.*, p. 95, t. 33, f. 10 (original), 1888.

The three shells separately described as distinct species, namely, *Cyclostrema Weldii*, *C. Susonis*, and *Cirsonella australis*, are, in my judgment, conspecific. Their specific distinctness was not publicly challenged till 1895, when Brazier expressed the opinion that *Weldii* and *australis* were identical. Tyron, from his study of examples of the two Tasmanian species, follows Woods in their generic location, though further assigned them to the group *Tubiola*. With regard to Angas's *Cirsonella australis*, which it is evident he had no personal knowledge of, he was not so fortunate in the selection of a classificatory position for it. We, thus, had at this date the one species under two generic denominations. Brazier, following on, had to make choice of either *Cyclostrema* or *Tinostoma*, and very unhappily prefers the latter, retaining *Cirsonella* in subordination. That the species under consideration is not a *Tinostoma* but is a *Cyclostrema*, does not admit of argument; the distinctive characters of the two genera are too pronounced to make confusion possible. By comparison of authentic specimens of *C. Weldii* and *C. Susonis* with the type of *Cirsonella australis* preserved in the British Museum, I am able to confirm Brazier's suggestion that *C. Weldii* and *C. australis* are conspecific; but I differ from him as to the priority of the former name.

Tenison-Woods' paper containing a diagnosis of *C. Weldii* was read August, 1876, but was not published till 1877; that of Angas containing his *Cirsonella australis*, was read January 16, 1877, and was published early in that year. It may not be possible to ascertain definitely which publication appeared first, but as Angas's description is accompanied by figures, and Tenison-Woods's is not, preference should be given to his name, though, at the same time, Tenison-Woods's diagnosis is exact, whilst that of Angas is very superficial.

Brazier considers, moreover, that Tenison-Woods redescribed his *C. Weldii* as *C. immaculata*, but if he had consulted the diagnosis of that species he would have satisfied himself that not a single character is applicable to *C. Weldii*; in point of fact, *C. immaculata* is an immature *Liotia*, probably the shell so misnamed is *Cyclostrema Susonis*. I may add in this connection that the identification of Tenison-Woods's species is open to mistrust. I have had the same species communicated to me by different Tasmanian conchologists under three specific names representing three genera. This discord is largely attributable to the circumstances that the type examples in the Hobart Museum are not indicated, and that labels in some instances are

misplaced. These are facts which I have assured myself of, as regards certain cotypes labelled by Tenison-Woods most obligingly given me by Mr. Legrand, as they did not agree with the reputed types, and which I further found were at variance with the diagnoses. The quotation of *C. immaculata* under *C. Weldii* is evidently another case in point. Mr. Brazier trusted his correspondent, and his correspondent may have relied upon on the naming in the Hobart Museum; each believing their sources of information reliable, they have unwittingly perpetrated a grave error. Touching the identity of *C. Susonis* and *C. Weldii*, I may point out that the essential differences between these two so-called species, as indicated in Tenison-Woods's diagnoses, admit of explanation; they may be tabulated as follows :—

Weldii—diameters, 2 x 2 mm.; whorls six, growth lines present, umbilicus marginate.

Susonis—diameter, 1·5 mm.; whorls four, no ornament, umbilicus emarginate.

The smaller size and fewer whorls of *Susonis* indicate a younger shell. The spiral lines on the base of *Weldii* may be two or three; sometimes the one adjacent to the umbilical chink is more pronounced, in other examples the spirals are wanting. The presence or apparent absence of growth-lines may vary with the condition of the test. To sum up in the words of my correspondent, Mr. W. May, of Tasmania, "the margined umbilicus is not constant, but varies from several distinct grooves to perfect smoothness;" and, again, "I can see no difference between *C. Weldii* and *C. Susonis*"—opinions which I endorse, based on independent study of the species.

Specimens of *C. australe* in my cabinet, coming from New South Wales, Tasmania, and South Australia have the opercula preserved. The operculum is concave on the outer face, thin, translucent, of seven to eight whorls around a central nucleus, obliquely and distantly striated.

Habitat.—New South Wales (type of *Cirsonella australis !*); Tasmania ! (types of *C. Weldii* and *C. Susonis*); South Australia, Streaky and Fowler Bays (R. Tate), St. Vincent Gulf (Dr. Verco !), Noarlunga and Macdonnell Bay (Mr. Adcock !).

Cyclostrema micron. *Ten.-Woods.*

1877, *C. micra*, Proc. Roy. Soc., Tasm. for 1876, p. 147.

Cyclostrema (*Tubiola*) *micra*, Tryon, Man. Conch., X., p. 95, t. 33, f. 13 (original).

This is more turbinate than *C. australe*. In addition to its Tasmanian habitat, it occurs in South Australia.

Cyclostrema contabulatum, *spec. nov.* Pl. vii., fig. 6.

Shell small, globosely turbinate, narrowly umbilicated, thin, translucent, smooth and shining; whorls four, convex, narrowly flattened at the suture, marked with fine oblique growth striæ. Body-whorl rounded at the periphery. Aperture slightly oblique, subcircular; peristome complete; columella-lip slightly arched and everted, somewhat concealing the small umbilicus.

Dimensions of figured example:—Major diam., 2·26; minor d am., 1·72; height, 2·28 mm.

Localities.—Streaky and Fowler Bays, abundant in shell-sand; also Salt Creek, St. Vincent Gulf.

This species is related to *C. micron*, but is narrowly umbilicated, and the whorls are shouldered.

Genus Lodderia, *Tate*, 1899.

Cyclostremella, Tate, 1898, non Bush, 1897.

Lodderia Lodderæ, *Petterd, sp.*

Liotia Lodderæ, Petterd, Journ. Conch., p. 135, 1884; *id.*, Hedley, Proc. Linn. Soc., N.S.W., vol. XXIII., 1899, p. 802; three woodcut figures.

Localities.—Tasmania (Petterd!); South Australia, Denial, Streaky, and Fowler Bays (R.T.), Port Victor and MacDonnell Bay (A. Adcock!); New South Wales, Sydney Harbour (C. Hedley!).

L. Lodderæ has the operculum and vitreous test of the Cyclostrematidæ.

From the observations of Messrs. Hedley and Pilsbry, *op. cit.*, *Vitrinella liricincta*, Garrett, is congeneric; and a third species may be the following.

Lodderia minima, *Ten.-Woods, sp.*

Liotia minima, T.-Woods, Proc. Roy. Soc., Victoria, 1877.

I have not seen this species, but from the description it would seem to be allied to *L. Lodderæ*. The habitat is not stated, but it is presumably either Tasmanian or Victorian.

Genus Pseudoliotia, *Tate*, 1898.

Pseudoliotia micans, *A. Adams, sp.*

Cyclostrema micans, A. Adams, P.Z.S., 1850; *id.*, A. Adams, Thes. Conch., t. 255, f. 7 and 27; *id.*, Tryon, Man. Conch., 1888, X., p. 88, t. 31, f. 17, 18 (copied).

Liotia Angasi, Crosse, Jour. de Conch., 1864, t. 13, f. 4; *id.*, Tryon, *op. cit.*, p. 110, t. 36, f. 4 (copied).

Liotia speciosa, Angas, P.Z.S., 1871, t. 1, f. 26; *id.*, Tryon, Man. Conch., X., p. 110, t. 36, f. 5 (copied).

Cyclostrema micans (including *Liotia Angasi*), Tate, Trans. Roy. Soc., S. Austr., XXI., p. 43, 1897.

Cyclostrema micans, var. *gracilior*, Tate, *op. cit.*, XXII., p. 71, 1898.

I have already indicated that my study of the types of *C. micans* and *L. Angasi*, which are in the British Museum, leads me unhesitatingly to declare them conspecific; though they have been treated as distinctive, both generically as well as specifically, by Tryon. Authenticated specimens of *L. speciosa*, received from the Australian Museum, are certainly congeneric with *C. micans*, and, in my judgment, belong to the micromorphic state of that species; and in slight decrescence of the ornament make an approach to the varietal form, which I have named *gracilior*. Tryon thought that *L. speciosa* would prove synonymous with *L. Angasi* (*op. cit.*, p. 110). The operculum of *Pseudoliotia micans* is horny, pellucid, nucleus central, four-whorled; the outer face is concave, obliquely and distantly ridged.

Distribution.—Japan (types of *C. micans!* and *C. pulchella*) and Singapore; S. Queensland (Brisbane Museum!); New South Wales (*L. Angasi!* and type of *L. speciosa!* by Angas); Victoria; Tasmania (*Tenison-Woods*); South Australia (type of *L. Angasi!*).

Pseudoliotia micans, var. Gowllandi.

Liotia Gowllandi, Brazier, P.Z.S., 1874, t. 83, f. 1-2; *id.*, Tryon, Man. Conch. X., p. 110, t. 36, f. 7-8 (copied).

According to Tryon this species appears to him "to be synonymous [with *L. speciosa*], judging from description and figure." Certainly they are not helpful to a solution of the validity of the species, but thanks to Mr. Hedley I have received four specimens of Brazier's shell, which permit me to offer the following observations:—*L. Gowllandi* is a micromorph, and like other small states of *C. micans* (as *var. gracilior* and *speciosa*) has only two keels instead of three on the upper surface of the body-whorl; moreover, there is a tendency to fusion of the two peripheral keels and to obliteration of the basal rib, and in consequence of the latter feature the threads on the base radiate uninterruptedly from the periphery to the keel. The same form occurs at Western Port, but of the many examples of it under observation some show variability in this particular towards differentiation of the keels.

Localities.—Percy Island, N.E. coast of Australia (Brazier's type); Milne Bay, New Guinea (C. Hedley!); Port Western, Victoria (R. Tate!).

List of species attributed to Cyclostrematidæ recorded as Australian.

Names previously recorded.	Names adopted.
Angeli (Rissoa), *Ten. Woods.*	Cyclostrema Angeli.
Angeli (Rissoa), *Tryon.*	Cyclostrema crebresculptum.
Australis (Cirsonella), *Angas.*	Cyclostrema australe.
*Brunniensis, *Beddome.*	Skenea ? Brunniensis.
Cingulifera, *A. Adams.*	Not Australian.
Harriettæ, *Petterd.*	Cyclostrema Harriettæ.
Immaculata, *Ten.-Woods.*	Liotia sp. (juv.).
Johnstoni, *Beddome.*	Cyclostrema Johnstoni.
Josephi, *Ten.-Woods.*	Collonia Josephi.
Lævis, *Kiener.*	Not Australian.
Lodderæ, *Petterd.*	Lodderia Lodderæ.
Micans, *A. Adams.*	Pseudoliotia micans.
Micra, *Ten.-Woods.*	Cyclostrema micron.
Micra, *Petterd.*	Cyclostrema charopa.
Minima (Liotia), *Ten.-Woods.*	Lodderia minima.
Spinosa, *Ten.-Woods.*	Astralium sp. (juv.).
Susonis, *Ten.-Woods.*	Cyclostrema australe.
Tatei, *Angas.*	Cyclostrema Tatei.
Weldii, *Ten.-Woods.*	Cyclostrema australe.

FAMILY LIOTIIDÆ.

Genus Liotia, *Gray*, 1842.

Tryon in his Manual of Conchology adopts the section *Liotina*, and refers to it as its sole living representative our *L. australis*, but in doing so he has misapplied certain distinctive features attributed to *Liotina* which are not possessed by *L. australis*.

Liotina was established by Munier-Chalmas in 1877 (*fide* Fischer) for the reception of *L. Gervillei*, Defrance, and two other Eocene species of the Paris-Basin. The salient characters claimed for it are :—"Shell not nacreous interiorly, umbilicus with a tuberculose funiculus." Aperture "not nacreous" does apply to the species of the Paris-Basin, rather as a consequence of fossilization than that they were originally so, in the same way that a much-bleached beach example of *L. australis* will have lost its nacre. However, the phrase is most certainly not applicable, as implied by Tryon, to fresh specimens of *L. australis*.

Again, I find that the several species of *Liotia* actually known to me have, at least in the adult stage, a spiral funiculus in th

* From Mr. May I have received an authentic example of Beddome' shell ; it has not the aspect of a *Cyclostrema*, and its two and a-half whorl are suggestive of an embryonic or very juvenile stage ; I am unable to locate it generically. Mr. May remarks, *in litteris*, on its resemblance to *Skenea planorbis*.

umbilical crater. However, it is not tuberculose as in the fossil *L. Gervillei*, but is dentated in *L. australis* and *L. Tasmanica*, and crenated in *L. clathrata*, *L. subquadrata*, and *L. Mayana*.

I fail, therefore, to appreciate the alleged differences which separate *Liotina* from *Liotia*; the differences presented by the umbilical funiculus are specific only, whilst the non-nacreous attribute is more apparent than real.

Liotia australis, *Kiener, sp.*

Reference.—Iconog., t. 4, f. 7 (Delphinula); *id.*, Reeve, Icon-Conch. (Monograph of Delphinula), f. 20, 1843.

Kiener's type was collected by Peron (Baudin Expedition) at St. Pierre and St Francis Isles in South Australia, and cotypes are referred to the Phillippines. The species is common in South Australian waters, I know it from Victoria, and it is recorded for Tasmania by Tenison-Woods.

L. australis has an operculum proper to the genus. The anterior thickening of the columella is decurrent on the umbilical rim, and the spiral funiculus is sharply dentated on the edge. The species exhibits great variability in size of the adult, the adult stage being indicated by the largely thickened aperture, thus a macromorph has a maximum diameter of 12 mm., an extreme micromorph 4·5, whilst these two are linked by intermediate sizes.

Liotia annulata, *Ten.-Woods.* Pl. vi., figs. 7*a*-7*b*.

Reference.—Proc. Roy. Soc. Tasm., for 1877, p. 121, 1878; *id.*, Tryon, Man. Conch., X., p. 111, t. 36, f. 20 (original).

Synonym.—*Liotia compacta*, Petterd, Jour. Conch., 1884, p. 135.

I have examples from Tasmania and Corio Bay (J. Mulder), Victoria, which agree in the chief particulars with Tenison-Woods's description and Tryon's figure of *L. annulata*; but all are without completed apertures, are minute or small sized and few-whorled, and are presumably immature, or have not yet acquired the characteristic apertural conformation of an adult *Liotia;* however, the inner shell layer is nacreous, and the generic location is probably correct. It is neither the young of *L. australis*, as has been suggested, nor that of any of our Southern species. *L. australis* at 3 mm. diameter has a strong cancellate ornament; *L. Tasmanica* of the same size, which on account of its planorbiform shape most resembles *L. annulata*, has transverse frills developed on the periphery only and is without spiral lineation.

A feature omitted by Tenison-Woods and Tryon, which is exhibited by an example of 3 mills diameter, is the possession of three linear ridges on the periphery of the last whorl, which are

rendered distinct by the slight vaulting of the erect lamellæ at the intercrossing. Ten-Woods does not describe the periphery, and Tryon's figure shows the periphery uninterruptedly convex; and as his example has a diameter of 1.5 mm. only, it is clear that the peripheral lineation is acquired at a more advanced stage of growth; Petterd's type of *L. compacta*, which measures $1\frac{1}{4}$ mills, is similar.

The type of *L. compacta*, which I figure, as also all other examples seen by me and considered conspecific, is ornamented with transverse striæ between the ribs; on the other hand, Ten.-Woods says of his *L. annulata*, the "interstices smooth." In all other respects the two shells are identical, and to reconcile the discrepancy in their diagnoses, it may be assumed that "smooth" as applied by Ten.-Woods refers to the appearance as seen by the unaided eye. Petterd's character, "aperture expanded," conveys a false impression; Ten.-Woods's observation is the correct one, "aperture bearing a varix round the mouth like one of the rings of the spire," and notes "the aperture has hardly that thickening which we observe generally in the genus,"

Liotia Tasmanica, *Ten.-Woods.*

1865. *Liotia siderea*, Angas (list-name), P.Z.S., p. 178 (non Reeve).

1876. *Liotia Tasmanica*, Ten.-Woods, Proc. Roy. Soc., Tasm., for 1875, p. 153.

1895. *Liotia Tasmanica*, Hedley, P.L.S., N.S. Wales, vol. IX., p. 465, three woodcuts.

The South Australian shell which has been so long known as *L. siderea* is not Reeve's species, as I have satisfied myself by comparison with his type in the British Museum; they have much resemblance, but the Philippine shell has in particular a much more ample body-whorl. An immature shell of *L. Tasmanica*, all that I have seen, is identically that of the earlier whorls of the South Australian so-called *siderea*, whilst Hedley's figures of the Tasmanian shell remove all doubt as to the identity of the two. *L. siderea*, Reeve, is therefore expunged from the Australian fauna, as the only published occurrence of it is the faulty one by Angas. Tenison-Woods in his description compares his new species with *L. discoidea*, but in this regard an error of determination has been committed, as the Tasmanian shell of that name is not Reeve's species. The test and operculum of *L. Tasmanica* have the characteristics of the genus.

Liotia calliglypta, *Melvill.*

Reference.—Journ. Conch., VI., t. 2, f. 10, p. 410, 1891.

The type was taken at Thursday Island, North Australia.

This may not be a *Liotia*, as "labro exteriori subreflexo" does not apply in the genus unless the shell is at that stage when the varied lip is commencing to be formed.

Liotia clathrata, *Reeve, sp.*

Reference.—Icon. Conch. (Delphinula), f. 21.

The type is from the Philippines, and Reeve adds Australia. I have examples from New South Wales (ex. Aust. Mus.) and Queensland (ex. Brisbane Mus.); the operculum is *Liotian*.

Liotia discoidea, *Reeve, sp.*

Reference.—Op. cit., f. 15.

A Philippine shell, but has been recorded from North Australia.

Liotia muricata, *Reeve, sp.*

Reference.—Op. cit., f. 18.

Another Philippine shell extending to North Australia.

Liotia Mayana, *spec. nov.* Pl. vi., figs. 5*a*-5*c*.

Syn.—L. discoidea, Ten.-Woods, Proc. Roy. Soc., Tasm., for 1877, p. 39, 1878, non Reeve.

I have had under examination Tasmanian examples attributed to *L. discoidea*, Reeve, but fail to recognise in them the distinctive characters of that species, as indicated by diagnosis and illustrations of it; especially is inapplicable "periphery with two prominent ribs," and the ornament of the base is different. The same species has been dredged by Dr. Verco in some abundance in South Australian waters.

In size and general appearance it resembles *L. subquadrata*, but the suture is not excavated, the aperture not so explanulately thickened, and its columella-margin is detached from the umbilical rim.

Its affinity is, however, greater with *L. clathrata* (actual examples compared) which has three liræ of equal size on the periphery instead of gradually diminishing in strength from above downwards, the costæ are more elevated, imbricating, and closer. In *L. Mayana* the last whorl is more rounded, keels less elevated, with four instead of three on the periphery; posterior whorls with three, not two, keels; keel at the suture nodular, not spinulose.

Habitat.—Tasmania, the species is rare; Victoria, South Australia (St. Vincent and Spencer Gulfs, and Fowler Bay, not uncommon in shell-sand).

Liotia subquadrata, *Ten.-Woods.*

1877. *Cyclostrema immaculata*, Tenison-Woods. Proc. Roy. Soc.. Tasm., for 1876, p. 148.

1877. *Liotia lamellosa* (pars.), Ten.-Woods, op. cit., p. 96.

1878. *Liotia subquadrata*, Ten.-Woods, P.L.S., N.S. Wales, ii., p. 236.

As already pointed out *Cyclostrema immaculata* was founded on a very immature condition (3 mm. diam.) of a Liotia, the adult form being presumably *L. subquadrata*; the absolute inadequacy of the diagnosis makes it desirable to suppress the name. In the same year the author described a Table Cape fossil as *L. lamellosa*, and in an appended note stated that a living example had been dredged off the Tasmanian coast. On comparison of the recent and fossil specimens I found differential characters to obtain such as are set forth in P.L.S. ii., p. 236, wherein Mr. Woods has applied the name of *L. subquadrata* to the living species.

Habitat.—Tasmania! and South Australia!; a rare shell, Middleton and Macdonnell Bay (A. Adcock!).

Liotia densilineata, *spec. nov.*

This species has the general aspect of an immature *L. australis*; the revolving liræ are almost obsolete, wholly so on the base; the transverse threadlets are depressed, very numerous, and crowded so as to obliterate entirely the cancellate ornament; the axial threadlets are fasiculated at both sutures giving rise to a corona on the anterior whorls and subspinose developments on the earlier ones; the umbilicus is large, its margin coronated by the fasciculation of the transverse threadlets. Aperture circular, outer margin slightly dilated but not varicose (the shell is probably not yet adult); columella margin is detached from the umbilical rim; the operculum is that proper to *Liotia*.

In *L. subquadrata*, the transverse ornament consists also of fine threadlets, but its revolving ridges are few and bold, imparting a quadrate outline to the last whorl.

Max. diam., 7; min. diam., 5; height, 4·5.

Habitat. — D'Entrecasteaux Channel, Tasmania (very rare). One example received from Mr. W. L. May, which is much corroded, and altogether its condition does not permit of a satisfactory pictorial representation.

List of Species-names Excluded or Synonymic.

Angasi, Crosse = Pseudoliotia micans.
Compacta, Petterd = L. annulata.
Discoidea, Ten.-Woods = L. Mayana.
Gowllandi, Brazier, is a Pseudoliotia.
Lodderæ, Petterd, is a Lodderia.
Minima, Ten.-Woods, is a Lodderia.

Peroni, Kiener (Delphinula), is not Australian.*
Siderea, Angas = L. Tasmanica.
Speciosa, Angas = Pseudoliotia micans.

Species Dubious.

Incerta, Ten.-Woods, Proc. Roy. Soc., Tasm., for 1876, 1877 p. 148.

Mr. Petterd, 1888, regarded this shell as an immature *Astralium Tasmanicum*, but this cannot be correct, as, except "nacreous," none of the characters of *L. incerta* apply to a young shell of *Astralium Tasmanicum* = *aureum*, of 5 mm. diameter. On the other hand, Mr. Legrand states that it is a decided species of *Liotia*, whilst the author of the species writes, *op. cit.*, "I only provisionally class it as a *Liotia*." I incline to the opinion that it is an immature *L. Tasmanica*. In any case, it will be well to suppress the name.

* This shell is recorded from the Indo-Pacific regions, whilst the type is attributed by Peron to the Isles St. Pierre and St. Francis, off the coast of Western South Australia. That locality is the only Australian record known to me; it should be rejected, not only on that account, but also because it and other well-known species of the tropics attributed to the same locality by Peron, such as *Tellina capsoides*, *Isocardia semisulcata*, &c., have not been rediscovered in our temperate waters.

Contributions to a Revision of the Recent Rissoidæ of Australia.

By Professor Ralph Tate.

[Read September 5, 1899.]

Contents :

I. Introductory Remarks.
II. Classified List of Rissoiæ.
III. Classified List of Rissoinæ.
IV. Descriptive Notes on South Australian Rissoinæ (including diagnoses of new species).

I. INTRODUCTORY REMARKS.

By way of apology for the fragmentary character of this essay I would explain—Firstly, that the large amount of South Australian material which I have accumulated in the last twenty years should no longer remain unrecorded, more especially that I have now elaborated our recent species in conjunction with those of the Older Tertiary of Australia ; secondly, in the endeavour to bring the Australian species into an alignment with the subordinate groups of each genus, and thus indicate a closer affinity *inter se*, I have found it necessary to make considerable emendations of nomenclature, and in view of the increasing competition (which I am extremely glad to note) among Australian conchologists, I think it desirable to record my investigations without delay. Though the chapter on Rissoiæ is, in the main, a rectification of nomenclature, yet the jackal-like conduct therein exhibited is a consequence rather than an incentive to play such a rôle.

The family Rissoidæ is represented in Australian waters by two genera only, *Rissoia* and *Rissoina*, viewed in their widest acceptation. Prior to the publication of the "Mollusca of the Novara Expedition," very few species of the family had been recorded for Australia. Since then the chief contributions are those by Tenison-Woods on the Tasmanian species, and by Watson on those collected by the Challenger Expedition.

As indicating the rapid gain of species in the family, I may refer by way of illustration to the growth of our knowledge of the South Australian contingent. The first provincial list of marine shells by Angas in 1865 contains only one species of the family (*Rissoina D'Orbignyi*); in 1880 the same conchologist

added four other species of *Rissoina* (based on material supplied by me). The genus *Rissoia* in one species (*R. Hulliana*) was recorded for the first time in my List of Marine Mollusca, published by Adcock in 1893. At that date I had in my possession the species herein catalogued, though their denominations had not then been authenticately assured, and so were not included. The South Australian Rissoids now number about 50; this very large increase is due to the dredging operations by Dr. Verco, whilst the denomination of a large number of the species results from a comparison of the Tasmanian species which have been placed at my service by Mr. W. L. May (who has taken great pains to identify his species with the types).

The following table, which shows the provincial distribution of the species, does not take into account the undescribed species (*Rissoia*, 14; *Rissoina*, 2) in the collection of Dr. Verco.

	Total *sp.*	S.A.	V.	T.	New S.W.	Q.	N.A.	W.A.
Rissoia	42	23	8	23	24	3	2	2
Rissoina	36	7	7	14	10	3	16	3
Total ...	78	30	15	37	34	6	18	5

The superiority of numbers in the columns for South Australia, Tasmania, and New South Wales is the outcome of conchological zeal actively and continuously pursued for the past twenty-five years or more; the inferiority of numbers in the other provincial columns signifies, on the other hand, paucity of results rather than as an expression of climatic influence on the development of species.

The Australian area, as a whole, compares very favourable in the number of its species (78) with the rest of the world.

The sign ! suffixed to a locality name indicates that specimens therefrom are in my cabinet or have been studied by me. The incompleteness of these "Contributions" arises from want of personal knowledge of certain species.

As a warning note, I may allude to the tendency in the family to great variability of size. Employing the modified aperture as an index to the adult condition, which we are safe in doing so, because in no case have I found indications of former apertural modifications. I appeal by way of illustration to my measures of a macromorph and a micromorph of my *Rissoina punctatissima*, both with completed apertures and of the same number of whorls. Despite this variability in size, not actually observed in all the species, I do not find correspondingly therewith variations of sculpture, at any rate not to that extent to make specific limitations difficult to define.

II. CLASSIFIED LIST OF RISSOIÆ.

I. Subgenus Rissoia.

1. Section Rissoia (*sensu stricto*).

R. salebrosa, Dunker, 1866.
S.A. (Dr. Verco), N.S.W. (type), Sydney (ex. Aust. Mus.!).

2. Section Apicularia.

R. trajecta, Watson, 1886.
N.A. (type).
R. novarensis, Frauenfeld, 1867.
N.S.W., Sydney (ex. Aust. Mus.!).

II. Subgenus Sabanæa.

1. Section Sabanæa (*s. s.*).

R. flammea, Dunker, 1866.
N.S.W. (type).
R. incidata, Dunker, 1866.
N.S.W. (type), Sydney (ex. Aust. Mus.!); S.A. (Dr. Verco).
R. bicolor, Petterd, 1884.
Tasmania (type)!; Streaky Bay, S.A.!
?R. dubitabilis, Tate (*nom. mut.*).
R. dubia, Petterd, 1884; non Defrance, 1827; non Johnston, 1884.
Tasmania (type).

2. Section Amphithalamus, *Carpenter*, 1865.

Scrobs, Watson, 1886.

R. scrobiculator, Watson, 1886.
N.S.W. (type).
R. olivacea, Dunker, 1867.
Diala tumida, T. Woods, and *R. Diemenensis*, Petterd, 1884 (teste Brazier).
S.A. (Dr. Verco); Vict.; Tasm.!; N.S.W. (type), ex. Aust. Mus.!
R. Frauenfeldi, Schwartz, 1866.
N.S.W. (type), ex. Aust. Mus.!; S.A. (Dr. Verco).
R. Pellyæ, Nevill, 1881.
S. Australia (type)!.
R. Petterdi, Brazier, 1894.
R. pulchella, Petterd, Jour. Conch., 1884, non Risso.
Tasmania (type)!; South Australia (Dr. Verco)!; New South Wales.
R. cyclostoma, Ten.-Woods, P.R. Soc., Tasm., 1877, p. 152.
R. (*Cingula*) *cyclostoma*, Tryon, Man. Conch., IX., p. 344, t. 71, f. 8.

It has been suggested that this species is only a smooth form of *R. Frauenfeldi*, but I consider it a valid species, as in addition to the smooth test, the shape is more pupoidal.

Tasmania (type)!; Victoria and S. Australia (Tate); New South Wales (Henn).

R. Tasmanica, Ten.-Woods, 1877, as Stylifer. Tasmania (type)!; South Australia and Victoria (Tate).

R. ischna, Tate (*nom. mut.*).

Rissoina cylindracea, Ten.-Woods, Proc. Linn. Soc., N.S.W., 1877.

The transference of this species to *Rissoia* necessitates the employment of a new name, because *cylindracea* has been in use in the genus by Krynicki 1837.

N.S.W.; off Port Jackson (type); authenticated examples in my collection, ex. Aust. Mus.

R. Jacksoni, Brazier, 1894.

R. badia, Watson, 1886, non Petterd, 1884.

N.S.W. (type), ex. Aust. Mus.!; S.A. (Dr. Verco).

R. Verconis, Tate (*nom. mut.*).

R. badia, Petterd., Jour. Conch., 1884, p. 138, non A. Adams, 1861.

Tasmania (type)!; N.S.W. (Henn.); S.A. (Dr. Verco).

R. microthyra, Martens.

S.A. (Dr. Verco); Mauritius (type).

3. Section Anabathron.

R. contabulata, Dunker, 1866.

S.A.!; V.; T. (W. L. May)!; N.S.W. (type), ex. Aust. Mus.!

R. unilirata, Ten.-Woods, P. R. Soc., Tasm., 1878, p. 123 (*Rissoina*).

Tasmania (type)!

III. Subgenus Cingula.

1. Section Cingula (*s. s.*).

R. mercurialis, Watson, 1886.

N.A. (type).

R. australiæ, Dunker, 1866.

N.S.W. (type).

2. Section Onoba.

R. Agnewi, Ten.-Woods, 1877.

Tasmania (type)!

R. Tenisoni, Tate (*nom. mut.*).

R. (*Cingulina*) *australis*, Ten.-Woods, P.R.Soc., Tasm., 1877, p. 146; *id.*, 1878, p. 151 (emended description), non G. B. Sowerby.

R. (*Onoba*) *australis* (Ten.-Woods), Suter, Proc. Mal. Soc., 1898, p. 4.

Suter's description of this species is a copy of Ten.-Woods' earlier diagnosis, and he has overlooked the subsequent emendations made by that author.

The date of transference of *Rissoa australis*, G. B. Sby., to *Rissoina* was subsequent to the publication of Ten.-Woods' name, hence there was a dual employment of *australis* in *Rissoia;* similarly Watson describes an *australis*, whilst there is also *R. australiæ*, Dunker, 1866, a too similar name to make it desirable to retain *australis* for Woods's species.

Tasmania (type)!; Victoria; S.A. (Dr. Verco); Stewart Island, N.Z. (Suter).

3. Section Ceratia.

R. Maccoyi, Ten.-Woods, 1877.
Tasmania (type)!; S.A. (Dr. Verco); N.S.W.

4. Section Setia.

R. Atkinsoni, Ten.-Woods, 1877.
Tasmania (type)!; S.A.!
R. atropurpurea, Dunker, 1866.
S. Aust. (Dr. Verco); N.S.W. (type), ex. Aust. Mus.!.
R. nitens, Dunker, 1866.
N.S.W. (type), ex. Aust. Mus.!; S.A. (Dr. Verco).
R. Beddomei, Tate (*nom. mut*).
R. flamia, Beddome, 1882, non *flammea*, Dunker, nec Pease.
Tasmania (type); N.S.W. (Brazier); Sydney (ex. Aust. Mus.!).
Beddome's name is an orthographical blunder.
R. torcularis, Ten.-Woods, 1877.
Tasmania (type).
R. mixta, Tate (*nom. mut.*).
R. ochroleuca, Brazier, 1894, non Brusina, 1869.
N.S.W. (type). Received from Aust. Mus.

5. Section Microsetia.

? R. approxima, Petterd., 1884.
Tasmania (type).
? R. Layardi, Petterd., 1884.
Tasmania (type).

6. Section Cingulina.

R. melanochroma, Tate (*nom. mut.*).
R. melanura, Ten.-Woods., Proc. Roy. Soc. Tasmania, 1877, p. 153.
R. (*Cingulina*) *melanura*, T. Woods, Tryon, Man. Conch., IX., p. 358, t. 7, f. 7.

I have changed Woods's name because it had been previously employed in the genus by C. B. Adams in 1850.

Tasmania (type)! Cape Northumberland and West Coast of S. Australia.

IV. Subgenus Alvania.

1. Section Alvania (*s. s.*).

R. devecta, Tate (*nom. mutand.*).

Alvania gracilis, Angas, P.Z.S., 1877, p. 174, t. 26, f. 16; *id.*, Tryon, Man. Conch., IX., p. 364, t. 66, f. 47 (copied).

The prior employment of *gracilis* in the genus by MacGillivray makes it necessary to substitute another name for the one given by Angas.

Port Jackson, New South Wales (type), ex. Aust. Mus.!

S. Australia (Dr. Verco).

R. Hulliana, Tate, 1893.

Dunkeria fasciata, Ten.-Woods, P.R.S., Tasm., 1876, p. 146; *Alvania fasciata*, Ten.-Woods, *op. cit.*, 1877, p. 152 (emended description).

Rissoa (*Alvania*) *Hulliana*, Tate (*nom. mut.*). Hand List, S. Australia Moll., 1893, p. 7.

The prior employment of the species name *fasciata* for a Rissoia by Requien in 1848, Coq. Corse., p. 56, necessitated a new name, which is in compliment to Rev. T. Hull, who was, while resident in Tasmania, an enthusiastic conchologist.

Tasmania (type)! Victoria, S. Australia (abundant at Streaky and Fowler Bays), and W. Australia (R. Tate).

R. Strangei, Brazier, 1894.

R. lineata, Petterd., Jour. Conch., 1884, p. 137.

R. (*Apicularia*) *Strangei*, Brazier, P.L.S., N.S.W., IX., 1894, t. 14, f. 11, p. 173; *id.*, p. 695, 1895.

Petterd's name is the older. *R. Strangei* was independently described in 1894, and subsequently Brazier showed the two to be identical, and because of the pre-occupation of *lineata* by Risso in 1826 his name must stand.

Tasmania! (type of *R. lineata*); New South Wales (type of *R. Strangei*); S. Australia (Dr. Verco).

R. Bayntoni, Beddome, 1882.

Tasmania (type).

2. Section Alvinia.

R. cheilostoma, Ten.-Woods, 1877.

R. plicata, Hutton, Cat. Marine Moll., N.Z., 1873, p. 29; *id.*, Suter, Proc. Mal. Soc., III., p. 6, 1898 (non Deshayes, 1838).

R. cheilostoma, Ten.-Woods, Proc. Roy. Soc. Tasmania, 1877, p. 152; *id.*, Tryon, Man. Conch., IX., p. 366, t. 68, f. 31 (original).

Alvania elegans, Angas, P.Z.S., 1877, t , f. (non A. Adams, 1851, non. Brusina, 1869).

Suter has identified the New Zealand and Tasmanian shells, despite certain descrepancies in the two diagnoses. This step is substantiated by his re-description of Hutton's species based on New Zealand specimens, and gives priority to Hutton's name. The insufficiency of the original diagnosis has been rendered further unstable by the author's uncertainty as to the generic location of his species, thus at first regarded as a *Rissoia*, it was transferred to *Rissoina* in 1880 and to *Eglisia* in 1885. Under these circumstances I would press the rigid exercise of the rule of priority to preserve Tenison-Woods's name (Angas' name has been in prior use by at least two authors) and this is afforded by the fact that Deshayes in 1838 (*teste* Schwartz) described a *Rissoa plicata*.

Tenison-Woods and Angas placed their species in *Alvania*. I agree with Tryon and Suter in quoting the species under *Alvinia*, a section later erected by Montserrato in 1884.

Tasmania (type)!; Cape Northumberland, S. Australia (R. Tate); Victoria.

New South Wales (type of *R. elegans*), ex. Aust. Mus.!

New Zealand (type of *R. plicata*).

R. Garretti, Tate (*nom. mut.*).

R. venusta, Garrett, 1873, non Philippi, 1844.

South Queensland (ex. Brisbane Mus. !); type-locality Viti Is.

Synonyms and Excluded Species.

Angeli, *Ten.-Woods*=Cyclostrema Angeli.
Australis, *Ten.-Woods*=R. Tenisoni.
Badia, *Petterd*=R. Verconis.
Badia, *Watson*=R. Jacksoni.
Brazieri, *Ten.-Woods*=Assiminea, sp.
Cylindracea, *Ten.-Woods* (Rissoina)=R. ischna.
Diemenensis, *Petterd*=R. olivacea.
Dubia, *Petterd*=R. dubitabilis.
Elegans, *Angas*=R. cheilostoma.
Fasciata, *Ten.-Woods*=R. Hulliana.
Flamia, *Beddome*=R. Beddomei.
Gracilis, *Angas*=R. devecta.
Lineata, *Petterd*=R. Strangei.
Mariæ, *Ten.-Woods*=Diala varia.
Melanura, *Ten.-Woods*=R. melanochroma.
Ochroleuca, *Brazier*=R. mixta.
Plicata, *Hutton*=R. cheilostoma.
Pulchella, *Petterd*=R. Petterdi.
Punctatostriata, *Ten.-Woods*=Adelactæon concinna=casta (teste Brazier).

Siennæ, *Ten.-Woods*=Assiminea Tasmanica.
Tumida (Diala), *Ten.-Woods*=R. olivacea.
Venusta, *Garrett*=R. Garretti.

III. CLASSIFIED LIST OF RISSOINÆ.

Key to the Subgroups of Rissoina.

Aperture with basal emargination.	
No funicular rib on base.	Rissoina.
Axially costated.	*Rissoina.*
Posterior whorls costated, anterior whorls smooth, or spirally striate.	*Morchiella.**
Sculpture reticulate.	*Phosinella.*
Sculpture of fine costæ and spiral striations.	*Zebinella.*
Spiral ribs nodulose, outer lip crenate.	*Pyramidelloides.*
Surface punctulate, aperture auriform, outer lip margined and expanded.	Diastictus.
A funicular rib on base.	Rissolina.
Aperture without basal emargination.	Schwartziella.

I. Subgenus Rissoina.

1. Section Rissoina.

R. scolopax, Sowerby.
North Australia (Melvill and Standen, Journ. Linn. Soc., 1899, p. 171).
Loyalty Island.
R. thaumasia, Melvill and Standen, 1898.
North Australia, Melvill and Standen, *op. cit;* Madras.
R. fasciata, A. Adams, 1851.
R. Smithi, Angas, 1867 (*teste* Brazier).
New South Wales (type); Sydney (ex. Aust. Mus. !).
R. Gertrudis, Ten.-Woods, 1876.
Tasmania (type); Victoria.
R. Hanleyi (Schwartz).
Philippines (type); New South Wales (ex. Aust. Mus. !); Victoria (R. Tate).
R. nivea, A. Adams.
S. Australia (type) !; Victoria; Tasmania !; W. Australia !
R. spirata, Sowerby, 1824.
S. Australia !; Vict. !; Tasm. !; N.S.W.; N. Aust.
R. triangularis, Watson, 1886.
N. Aust. (type).
R. variegata, Angas, 1867.
N.S.W. (type), ex. Aust. Mus. !; Tasm. !

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* See post, p. 240.

2. Section Phosinella.

R. clathrata, A. Adams.
N. Aust. (Chevert Exped.); Torres Straits (ex. Aust. Mus. !)
R. exasperata, Sowerby, 1866.
R. quasillus, Melvill (*teste* Hedley).
Palm and Darnley Islands, N. Aust. (Chevert Exped.); New Caledonia (type); Funafuti (Hedley).
R. Hedleyi, Tate, 1899.
South Australia (type).
R. horrida, Garrett.
R. Curtisi, E. A. Smith, *R. australis*, Sow., are synonyms after Tryon.
Queensland.
The quotation of this species for S. Aust. is an error; the single example so named is a worn *Rissoia cheilostoma*.
R. nodocincta, A. Adams, 1851.
North Australia.
R. semisculpta, Tate, 1899.
Tasmania. !

3. Section Zebinella.

R. elegantula, Angas.
West Australia to New South Wales; also S. Africa.
R. reticulata, Sowerby, 1824.
North Australia (Chall. Exped.).

4. Section Pyramidelloides.

R. miranda, A. Adams.
N. Aust. (Challenger Exped.).

II. Subgenus Diastictus.

R. punctatissima, Tate, 1899.
South Australia (type).

III. Subgenus Rissolina.

R. crassa, Angas, 1871.
W. Aust. !; S. Aust. !; Vict.; N.S.W. (type), ex. Aust. Mus. !; Queensland (ex. Brisbane Mus. !).
R. flexuosa, Gould, see post, p. 243.
W. Aust.; S. Aust. !; Victoria !; Tasm. !; N.S.W. (type), Sydney (ex. Aust. Mus. !).
R. mercurialis, Watson, 1886.
N. Aust. (type).
R. plicata, A. Adams, 1851.
R. scalarina, A. Adams; *R. turricula*, Pease (*teste* Hedley). N. Aust. (Chevert Exp.).

IV. Subgenus Schwartziella.

R. cincta, Angas, 1867.
N.S.W. (type); Tasmania.

Species Unclassified and Unfigured.

R. cardinalis, *efficata*, *inconspicua*, *inermis*, *pulchella*, and *teres*—all of Brazier, and all the types from North Australia.

R. Kershawi, *minutissima*, and *suprasculpta* of Tenison-Woods; *R. approxima*, Petterd, all of Tasmania.

R. cretacea, Tenison-Woods; type from New South Wales.

Synonyms and Excluded or Doubtful Species.

Angasi, *Pease* = flexuosa.
Australis, *Sowerby* = horrida (teste Tryon).
Brazieri, *Ten.-Woods*. A *Rissoia* is implied by the subgeneric title of *Setia*, but the shell belongs to *Assiminea*.
Concatenata, *Ten.-Woods*. From the description this is a doubtful *Rissoina*. If it belongs there, it is juvenile. Mr. May, who has studied the type, says it is unidentifiable.
Curtisi, *E. A. Smith* = horrida (teste Tryon).
Cylindracea, *Ten.-Woods*, is a *Rissoia*.
D'Orbignyi, *Schwartz* = spirata.
Flindersi, *Ten.-Woods* = Diala pagodula.
Lirata, *Angas* = nivea.
Montrouzieri = spirata.
Quasillus, *Melvill* = exasperata (teste Hedley).
Scalarina, *A. Adams* = R. plicata.
Smithii, *Angas* = R. fasciata.
St. Claræ, *Ten.-Woods* = Diala monile, var.
Tasmanica, *Ten.-Woods*, is a Rissoia.
Toxopleura, *Tate* = R. nivea.
Turricula, *Angas* = R. flexuosa (teste, Tryon).
Turricula, *Pease* = R. plicata.
Unilirata, *Ten.-Woods*, is a Rissoia.

DESCRIPTIVE NOTES ON SOUTH AUSTRALIAN RISSOINÆ.

Genus Rissoina.

Section Rissoina (*sensu stricto*).

Rissoina nivea, *A. Adams.*

References.—*R. nivea*, A. Adams, P.Z.S., 1851, p. 265; Schwartz, Rissoiden I., 1860, p. 47, f. 10; Reeve, Icon. Conch., f. 91; Tryon, Man. Coch., IX., 1887, p. 379, t. 55, f. 24 (copied from Reeve).

Synonyms.—*R. lirata.* Angas, P.Z.S., 1880, p. 417, t. 40, f. 11; Tryon, Man. Conch., IX., p. 373, t. 54, f. 10 (copied from Angas).

R. toxopleura, Tate (nom. mut.), Trans. Roy. Soc. S. Aust. XVII., 1893, p. 200.

R. nivea is referred by Tryon to *Schwartziella*, whilst he places *R. lirata* under *Rissoina* (*sensu stricto*). I am afraid that either I do not appreciate the differences between these sections or that Tryon had no personal knowledge of the species, as I have no hesitation in attaching *R. lirata* to *R. nivea*. If there be any question as to its sectional position, it should be as to its reference to *Zebinella*.

The type of *R. nivea* was collected at Port Lincoln, and the species was listed for South Australia by Angas, P.Z.S., 1878, p. 867; whilst the specimens which served him for his description and figure of *R. lirata*, published two years later, were supplied by me. The descriptions of the two are essentially identical, whilst my cotypes of *R. lirata* agree thoroughly with Schwartz's figure of *R. nivea*.

In ignorance of the invalidity of Angas' name I changed it, as above indicated, because it had previously been employed by Gould in 1861.

Distribution.—This species is common in shell-sand in St. Vincent Gulf, the type is from Port Lincoln, and I have taken it at Denial Bay on the west coast of South Australia. It has been sent to me from King George Sound, West Australia. Tenison-Woods records it for Tasmania.

Rissoina spirata, *Sowerby.*

References.—*R. spirata*, Sowerby, Genera Shells, 1820-24, t. 208, fig. 2; Schwartz, Rissoiden, 1860, p. 101, f. 69; Reeve, Icon. Conch., f. 17 (*bad*); Tryon, Man. Conch. IX., p. 388, t. 58, f. 29 (copied from Reeve).

Many synonyms are included by Tryon under *R. spirata*; of these *R. d'Orbignyi*, which, judging from Schwartz's figure of it, is inseparable. *R. d'Orbignyi* has been listed as a South Australian shell by Angas, but in 1893 I referred it to *R. spirata*.

The specimens which I attribute to *R. spirata* have the exact outline and size corresponding with Schwartz's figure, but instead of the anterior whorls having the axial ornamentation replaced by spiral striæ they present a gradual decadence in the strength of the costation, and though it is faint on the body-whorl, yet it is more conspicuous, even there, than the microscopic spiral striation.

Tryon refers *R. spirata* to *Morchiella*, but it offers, at any rate in our Southern Australian examples, no essential differences from *Rissoina* (*s.s.*); it is thus a connecting link between the two sections. A smooth and small kind also occurs. The Morchiella-state may possibly be exhibited in each of the sub-

ordinate groups, but at any rate it appears in at least two of them ; thus, *R. spirata* is a Morchiella among *Rissoina* (*s.s.*), and *R. Antoni* among *Phosinella*, and though I have not observed the total extinction of the ornament of the younger part of the spire on the body-whorl in other groups, yet the tendency thereto is shown by some species in each. On these grounds, Morchiella should be rejected.

Distribution.—In South Australia I have taken it at many localities throughout its coast-line, from the Great Australian Bight to Cape Northumberland. I have examined examples from Victoria and Tasmania. It is reported from New South Wales and North Australia. Occurs in New Caledonia (as *R. Montrouzieri*), &c., to Indian Ocean and Gulf of Suez.

Section Phosinella.

Rissoina Hedleyi, *spec. nov.* Pl. vii., fig. 8.

Solid, translucent-white, conically turrited. Whorls five (protoconch not known), moderately convex, suture impressed; ornamented by subacute axial ribs, much narrower than the concave interspaces, crenated by spiral sulcations and their intervening riblets, both axial and spiral ribs increase in number with the growth of the shell, the spiral riblets are absent on the first whorl, four on the next, six on the penultimate, and ten on the body-whorl. Aperture oblique, roundly elliptic; outer lip arched, thickly varicosed and crenated on the outer margin; inner lip arched, produced anteriorly; the basal funiculus nodulose-dentate, and truncated by the deep basal sinus.

Length, 4·25; width, 2 mills.

Fowler Bay, South Australia (R. Tate, 1879); and Port Western, Victoria (received from Dr. Pulleine).

From the reproduced figure and description given by Tryon, Man. Conch., of *R. Samoensis*, Dunker, in Kuster, Conch. Cab., t. 15c, f. 1, this new species must be closely related to it; the observable differences are that the Samoan shell has three spiral riblets on the antepenultimate, four on the penultimate, and seven on the body-whorl; whereas the South Australian shell has correspondingly four, six, and ten; and, moreover, the axial ribs are much wider apart. The species-name is in compliment to Australia's chief malacologist.

Rissoina semisculpta, *spec. nov.* Pl. vii., fig. 10.

Shell solid, translucent, conic-turrited; whorls five (apex deficient), gradated, separated by a depressed canaliculate suture; posterior whorls ornamented by axial, subacute plications, and three revolving riblets, which cut up the plications into somewhat nodulose crenatures.

The ornamentation begins to fade on the penultimate whorl, and the last whorl is smooth, except for a slight crenulation on the narrow shoulder, and faint spiral and axial lineation on the rest of the whorl.

Aperture oblique, semilunate, narrowed above, and effuse below; columella-lip very oblique, sinuate, distinctly produced, and thickened anteriorly; outer lip arched, anteriorly dilated, thickened, but not varicose.

Length, 6; width, 2·5 mm.

Locality.—Tasmania (received from Mr. W. L. May).

The only living species to which *R. semisculpta* approximates sufficiently to necessitate detailed comparison is *R. Antoni*, Schwartz, from which it differs by gradated whorls, axial costation more defined, and the nodulose cancellation hardly, or not at all, developed.

Section Zebinella.

Rissoina elegantula, *Angas.*

References.—*R. elegantula*, Angas, P.Z.S., 1880, p. 417, t. 40, f. 10; Reeve, Conch. Icon.

Tryon, Man. Conch. IX., t. 58, f. 13 (copied), p. 386.

Tryon "thinks that *R. elegantula* will prove a younger state of this species [*striata*, Quoy & Gaimard]; it has eight whorls and is six mills, long." Angas received his types from me, they were adults; the species exhibits, however, variation in size, a macromorph before me measures 8 mills, and has eight whorls, and the axial lines are not obsolete on the body whorl; so that there is good reason, in the absence of actual comparison, for the opinion that *R. elegantula* is different from *R. striata.*

Distribution.—In South Australia it is found in St. Vincent and Spencer Gulfs, and extends westward to King George Sound. I have named it from Victorian and Tasmanian examples, and Mr. Henn has recorded it from New South Wales.

Subgenus Diastictus.

Rissoina punctatissima, *spec. nov.* Pl. vii., fig. 9.

Shell conically pyramidal, somewhat thin and translucent (somewhat clouded at the suture and white at the aperture). Whorls five (apex unknown), slightly convex, spirally sulcated; sulci closely punctated in a single series. The sulci increase in numbers with the growth of the shell; on the posterior whorls the two, three, or four antesutural ones are wider and deeper than the rest; about twelve sulcations on the penultimate whorl; on the body whorl they are numerous, equally slender, and occupy the whole surface. Aperture auriform and somewhat explanulate;

the outer lip is very much thickened and prominently margined ; the aperture is but slightly angulated at the junction of the basal lip and the columella.

Dimensions.—Length, 6 ; width, 3 mills ; micromorphs range to half-size.

Localities.—Common in shell-sand at Streaky and Fowler Bays, collected there by me in 1879 ; I have also taken it at Aldinga Bay in St. Vincent Gulf.

This species is not a typical *Zebinella*, its ornamentation being limited to punctuate sulci, whilst its expanded and varied aperture still further removes it. Nevertheless, there are some points of agreement therewith, and the distinctive characters are not so trenchant as to justify generic separation. In the absence of material for comparison, I venture to place it in proximity to *Rissoina expansa*, Deshayes, of the Parisian Eocene, which M. Cossmann, 1888, has made the type of a new genus, *Diastictus*, the original diagnosis of which is as follows :—" Conica, subulata, anfranctis regulariter punctulatis ; apertura auriformi et expansilabri ; labro marginato et reflexo, columella arcuata, callosa." Omitting *subulata* (which is rather specific than of generic value) every word of the definition seems to be applicable to the recent species ; if my interpretation be correct, then *R. punctatissima* is another instance of an Eocene group surviving in Australian waters.

Subgenus Rissolina.

Rissoina crassa, *Angas.*

References.—R. crassa, Angas, P.Z.S., 1871, p. 17, t. 1, f. 16 Reeve, Conch. Icon., f. 70; Tryon, Man. Conch. IX., t. 55, f. 20 (copied).

Tryon refers this species to *R. Rissoi*, Audouin, inhabiting the Red Sea, but his figures of the two incline one to a different view.

Distribution.—The type is from Port Jackson, and South Australian examples from my collection were named by the author of the species. I have specimens of it from King George Sound ; it has been recorded from Victoria, and I have received it from Queensland under the name of *R. ambigua*. The South Australian occurrences are Holdfast Bay, Aldinga Bay and Salt Creek in St. Vincent Gulf, Waurailtie in Spencer Gulf, Streaky Bay, and at the Head of the Great Australian Bight.

Rissoina flexuosa, *Gould.*

References.—R. flexuosa, Gould, Otia, p. 144, Reeve, Conch. Icon., f. 97 ; Tryon, Man. Conch. IX., p. 380, t. 68, f. 1-2.

Synonyms.—R. turricula, Angas, P.Z.S., 1867, p. 114, t. 13, f.

20 ; Reeve, Conch. Icon., f. 69. *R. Angasi*, Pease, Amer. Journ. Conch. VII., 1872, p. 20.

This species has the apertural characters proper to *Rissolina*, and is, therefore, removed thereto from *Schwartziella*.

The types of *R. flexuosa* and *R. turricula* are both from New South Wales. Tryon states the origin of the synonyms, p. 381, *op. cit.*, as follows : —" Gould's description was made from an immature specimen ; Angas subsequently described it as *R. turricula*, which being pre-occupied by Pease, the latter changed it to *R. Angasi*." Reeve treats them as distinct species.

The identification of South Australian examples with *R. turricula* was in the first instance due to Angas, from material forwarded by me.

Distribution.—New South Wales (types). In South Australia it has the same range as *R. crassa*. I have identified examples from West Australia, Victoria, and Tasmania (previously recorded by Tenison-Woods).

Definitions of New Species of Land Shells from South Australia.

By Professor Ralph Tate.

[Read September 5, 1899].

Glyptorhagada euglypta, *spec. nov.* Pl. vi., figs. 3*a*-3*c*.

Shell sublenticular; spire broadly and flatly conical, slightly raised above the plane of the body-whorl; apex obtuse.

Whorls five, of somewhat rapid increase, nearly flat, separated by a linear impressed suture. Last whorl abruptly and briefly descending at the front, moderately inflated, sharply keeled; flatly convex from the peripheral keel to the suture but interrupted by a narrow flat or slightly depressed area contiguous with the keel; the anteperipheral area sharply curved and merging into the tumid base. Aperture sub-quadrately oval, the major axis transverse; margins feebly thickened and reflected; columella arched, expanded, and reflected over about one-half of the umbilical crater; margins of the aperture united by an adnate callus Umbilicus moderately wide, but deep, with somewhat precipitous sides, about one-sixth the diameter of the base.

The ground colour is unknown, as all the specimens are bleached, though a few of them still retain traces of rufous colour bands, one at the suture and one occupying the post-peripheral depression.

Sculpture.—The two apical whorls without sculpture or faintly closely transversely striated, the tip is small and immersed, the first whorl relatively large and somewhat inflated, graduating into the narrower and moderately convex second whorl. The ordinary spire-whorls are ornamented by refracted sharply elevated subacute corrugations, which are flatly crenated on their summits; on the last whorl, in particular, intermediate corrugations are crowded at the suture, the intercostal spaces have coincident lineations; the corrugations serrate the keel, about ten in a length of one millimetre measured in the anterior part of the whorl, thence they extend sigmoidally to the umbilicus.

Dimensions.—Major and minor diameters, 25 and 21; height, 13; horizontal and vertical diameters of aperture, 12; diameter of umbilicus, 4.

Locality.—Collected by Mr. H. Y. L. Brown, Government Geologist, at Anabama, situate about one hundred miles north-east from Burra Burra.

The specific name *euglypta* (well-carved), is in allusion to the bold sculpture of the shell.

Affinities.—This species, in respect of sculpture and shape, comes nearest to *Helix* (*Rhagada*) *Bordaensis*, Angas, 1880. It differs from it by larger size, relatively deeper (so that the aperture is different in outline), the spire slightly elevated, the corrugations stronger, more distant and crenulated, and by smaller umbilicus. The type of *G. Bordaensis* seems not to be adult; and all examples known to me of the size of the type have four whorls, not five as stated by Angas; and as indicative that the adult stage has not yet been reached, the body-whorl does not show descension at the front, or the margin of the aperture any reflection, or little or none of the columella.

Angasella polypleura, *spec. nov.* Pl. vi., figs. 2*a*-2*c*.

I have always been dubious as to the correctness of my reference to *Helix cyrtopleura*, Pf., of a helicoid snail collected by me in 1878, on the Bunda Plateau of the Great Australian Bight. Authentic specimens of Pfeiffer's species are not extant in any cabinet in Australia, and I cannot learn that the shell has been retaken at the original locality, "Plains near Lake Torrens." The geographical isolation of the two shells, 400 miles apart, with no species of Angasella in the intervening area, was suggestive of specific distinctness. Pfeiffer's description and figure are not detailed enough for safe determination of an allied species; but during my visit to England in 1896, I made actual comparisons of the Bunda shell with the type and cotypes of *H. crytopleura* in the Natural History Museum, London, with the result that in my opinion they are not conspecific. The new species has a more inflated body-whorl and more numerous riblets. [This is from memory, as my notes on the detailed differences have been lost.]

The following are the chief characters of *A. polypleura*:— Colour in life light-brown becoming sordid-white on the body-whorl. The body-whorl much descends in front, and is ornamented with about sixty sigmoid thread-like ribs the intercostal spaces are coarsely granular, the granules having a tendency to coalesce to form rugae. The peristome is largely and acutely reflected, and its margins joined by a thick adnate callus; the columella is arched and broadly and thickly reflected over part of the umbilical crater. The elevation of the spire varies from almost flat to as much as 4·5 mm. above the plane of the last whorl towards the front. The embryonic part, which consists of two turns, is relatively large and smooth (as seen under a pocket lense).

An average of the measurements of three fairly typical speci-

mens of *A. polypleura* compared with the dimensions of the type of *A. crytopleura* is as follows (in decimals of an inch) :—

	polypleura.	cyrtopleura.
Greatest diameter	·71	·70
Least diameter	·61	·57
Height of shell	·42	·25
Height of aperture	·35	

Locality.—Bunda Plateau, Great Australian Bight; in great abundance as dead shells strewn on the surface, but found living buried in the loess-soil at the bases of shrubs.

Flammulina Pulleinei, *spec. nov.* Pl. vi., figs. 1*a*-1*c*.

Shell umbilicated, depressedly conical, spire slightly elevated; colour reddish-brown. Whorls four, convex at anterior suture, thence flatly convex to posterior suture, of moderate increase; last whorl rounded at the periphery, base convex and somewhat inflated.

The ornament consists of very oblique subdistant lamella-like corrugations, with intervening close-set coincident lineations (about five or six), and transverse microscopic striæ in the interstitial spaces; the corrugations pass across the periphery in sigmoid curves to the umbilicus.

Aperture slightly oblique, roundly-oval; peristome incomplete, margins distant and acute; the columella-margin is dilated and reflected. Umbilicus of moderate size.

Major diameter, 4·25; minor diameter, 3·75; height, 2·5; diameter of umbilicus, ·75.

Two examples taken alive at Carrieton, S.A., by Dr. Robert Pulleine.

This snail has a caudal appendage, and its jaw consists of loosely conjoined plates, and thus far agrees with *Flammulina*. I do not know of any described species with which it is necessary to make comparison; some forms of *F. Fordei* present some resemblance in ornament, but in other respects that species is very different.

Helicina crassidens, *spec. nov.* Pl. vi., fig. 6.

Shell trochiform, somewhat thin, subtranslucent, and subvitreous. Spire regularly conoid, with a submammillary apex. Whorls four and a-half, slightly convex, but perceptibly depressed at the posterior suture; last whorl subangulated at the periphery. The ornament consists of elevated, acute, spiral ridges; five on the body-whorl above the periphery, and about four, more slender and closer ones, on the circumferential portion of the base.

Aperture slightly oblique, semilunar; peristome shortly expanded and subreflected; columella short, simple, gradually

curving to the basal lip; basal lip with a large tooth-like incrassation near to its junction with the columella.

Umbilical callus small, granulated. Operculum unknown.

Major diameter, 4; minor diameter, 3·5; height, 2·5.

One example found by Dr. Robert Pulleine in the rejectamenta of the River Wakefield, at Balaklava, S.A.

This species by its lirate ornament should fall in the group *Perenna*, Guppy, 1867, and on the other hand it has affinity with the *Lucidella*-like species by reason of its dentate peristome, a combination of characters which makes it unnecessary to institute comparisons. As the genus in Australia belongs mainly to the North-East, though reaching South into the coastal tracts of the Northern parts of New South Wales, the question naturally arises, Is the present species indigenous? or is it an accidental importation? But whatever may be its origin, I believe it to be undescribed. It may be urged in explanation of its anomalous geographic position, that a more marked paradox is furnished by *Stenopus rusticus*, which is restricted to the North-East extremity of Queensland and to the coast-cliffs on the east side of St. Vincent Gulf in South Australia.

EXPLANATION OF PLATES.

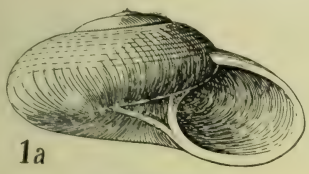
Plate VI.

Fig.

1*a*-1*c*. *Flammulina Pulleinei*, n. sp., p. 247.
2*a*-2*c*. *Angasella polypleura*, n. sp. p. 246.
3*a*-3*c*. *Glyptorhagada euglypta*, n. sp., p. 245.
4*a*-4*c*. *Cyclostrema Mayii*, n. sp., p. 218.
5*a*-5*c*. *Liotia Mayana*, n. sp., p. 227.
6. *Helicina crassidens*, n. sp., p. 247.
7*a*-7*b*. *Liotia compacta*, Petterd, p. 225.

Plate VII.

1*a*-1*b*. *Cyclostrema caperatum*, n. sp., p. 216.
2*a*-2*c*. *Cyclostrema charopa*, n. sp., p. 217.
3*a*-3*b*. *Cyclostrema inscriptum*, n. sp., p. 216.
4. *Cyclostrema delectabile*, n. sp., p. 216.
5. *Cyclostrema crebresculptum*, n. sp., p. 219.
6. *Cyclostrema contabulatum*, n. sp., p. 222.
7*a*-7*b*. *Cyclostrema Johnstoni*, Beddome, p. 215.
8. *Rissoina Hedleyi*, n. sp., p. 241.
9. *Rissoina punctatissima*, n. sp., p. 242.
10. *Rissoina semisculpta*, n. sp., p. 241.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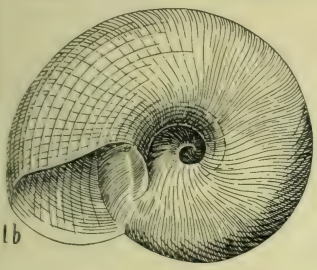
2a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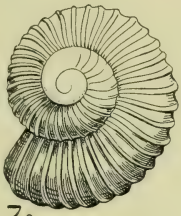
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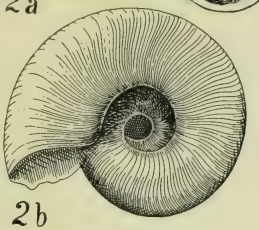
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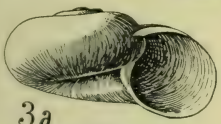
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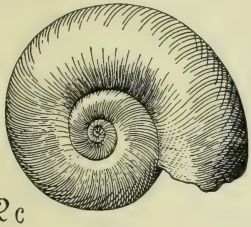
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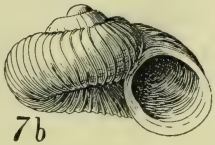
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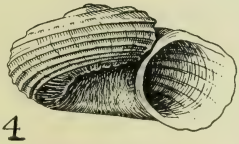
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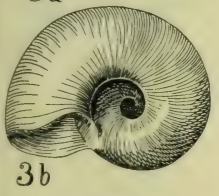
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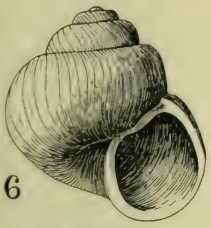
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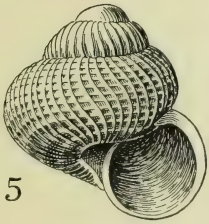
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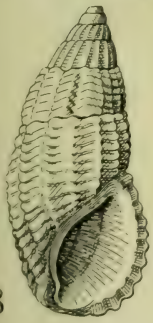
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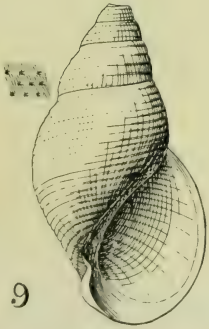
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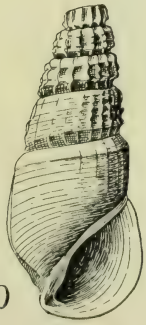
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C. Hedley del.

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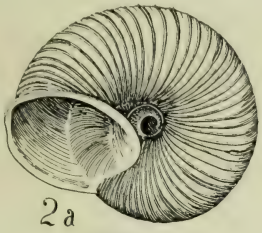
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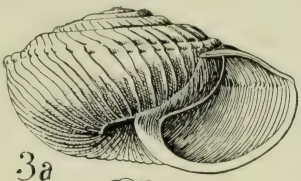
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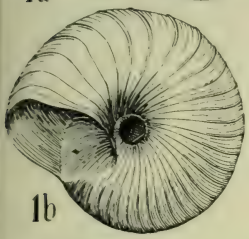
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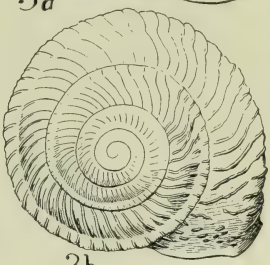
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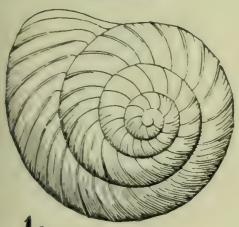
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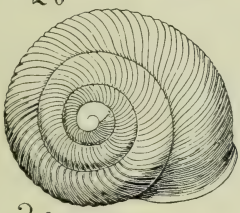
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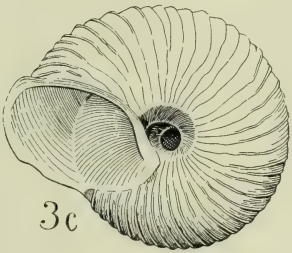
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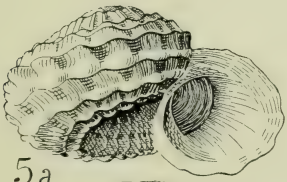
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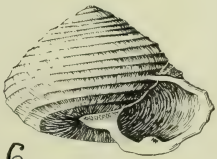
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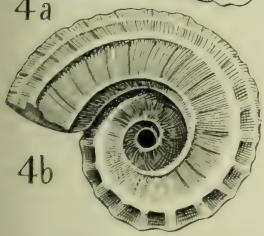
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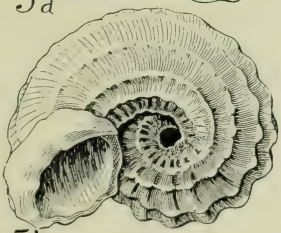
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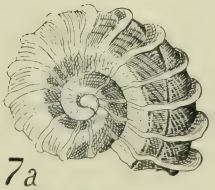
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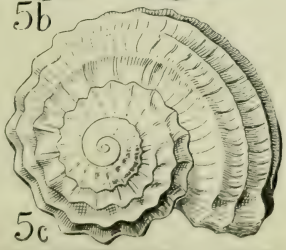
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C. Hedley del.

A Revision of the Older Tertiary Mollusca of Australia

Part I.

By Professor Ralph Tate.

[Read September 5, 1899.]

In 1880, I commenced the publication of a series of essays on the Mollusca of the Older Tertiaries of Australia, still far from completion; since that time many additional species have been obtained, a large number of which await diagnostic descriptions, other authors have occupied themselves with the fauna, and my opinions regarding some of the species have been changed as the result of fuller acquaintance with them and their related species. Taken altogether, it seems desirable to submit an up-to-date knowledge of the Molluscan constituents of our Older Tertiary faunas, so far, at least, as concerns those groups which have been systematically dealt with by me in the pages of these Transactions.

The "Revision" will consist of a list of admitted species under their revised generic and specific names, will include full references to additional species and diagnoses of new ones. The locality records will be given in full, these are based on specimens in the University Museum, Adelaide, for the great part, and on those that I have studied in other collections; other records than these are indicated by the suffixed names of the authors responsible for their determinations. Synonyms are the result of a comparison of types or of well-authenticated examples, unless otherwise stated. The localities of the types are printed in distinctive type.

The geological horizons admitted for the present are Eocene, Post-Eocene, and Miocene, as set forth more in detail in Trans. Roy. Soc., S.A., Vol. XXIII., p. 197, 1899.

The retrospective references under each species will not extend beyond the respective essays of mine on which this Revision is based, as prior references, unless involving misrepresentations, are therein contained. The chief bibliography of later date will be given under each class to which the publications indicated respectively refer.

CLASS PALLIOBRANCHIATA.

The geological distribution of Palliobranchs in Cainozoic horizons in Australia is very restricted, as with the exception of *Magasella Cumingiana*, a recent species in Post-tertiary deposits at the Tintinara bore, Tatiara Desert, at a depth of 154-160 feet. and of a species of Terebratella, *T. pumila*, in the Miocene at Gippsland Lakes, the whole fauna is of Eocene age, or, perhaps, extending to Oligocene. *Rhynchonella Baileyana* was wrongly attributed to the Australian Miocene. A few Eocene species had been listed as belonging to the Miocene fauna at Grange Burn and Muddy Creek near Hamilton; but as all examples collected, since full knowledge was gained that two distinct faunal horizons were in contact at those localities, exhibit the characteristic features of a derivative source, the species in the Hamilton Miocene are not considered to be of endemic origin.

Bibliographical Reference.

1. *Tate*, "On the Australian Tertiary Palliobranchs," Tran. Roy. Soc., S. Aust., vol. III., 1880, pp. 140-170, plates 7-11.

A contribution of apparent importance is plate 33 in R. M. Johnston's "Geology of Tasmania," 1888. This plate is devoted to the illustration of fifteen species of Tertiary Brachiopoda, some of them are reputed by the author to occur at Table Cape; however, as the figures are bad copies of those in my monograph, the local records based thereon are of no value. On pages 232 and 233 of the same work is a list of our Palæogene Brachiopods showing provincial occurrences in parallel columns. The Tasmanian list I can only revise from the collection made by me on two separate visits to Table Cape; and I am constrained to reject some of the names, as I have good reason to believe they were introduced through faulty identifications. In this connection I urge that a mere superficial examination is not always reliable, and that in several instances actual dissection is necessary to resolve the similitudes, such as are presented by *Terebratula vitreoides* and *Terebratella Tepperi*; *Magellania insolita* and *Terebratella furculifera* (adult); *Terebratula Aldingæ* and *Terebratella furculifera* (junior); *Terebratella Woodsii* and *Magasella lunata*.

FAMILY TEREBRATULIDÆ.

Genus Terebratula, *Bruguière*.

T. vitreoides, *T. Woods*, 1878, non Tate, **1**, p. 144. Pl. viii., fig. 5.

Post-Eocene.—Table Cape, Tasmania.

T. Tateana, *T. Woods*, 1878; *T. vitreoides*, Tate, **1**, p. 144; non *Waldheimia Tateana*, Tate, **1**, p. 150. Pl. viii., fig. 2.

My intrepretation of the two species of *Terebratula* in the Table Cape-beds, named as above, by Tenison-Woods, proves to be wrong, as the result of an examination of numerous examples, collected by myself, and of a careful study of Woods' indifferent figures.

The commoner shell is elongate-oval with a more or less biplicate front; the beak somewhat laterally compressed and somewhat protruding; the foramen, which is obliquely truncated, is narrow oval. Young shells of this species, which T.-Woods named *T. Tateana*, have all the features of the adult. I have traced them up to larger than the examples figured by me, **1**, t. 8, f. 5 *a—b*, t. 10, f. 7, as *T. vitreoides*, In wrongly attaching that name I was influenced by the fact that the specific character was in the name, as *Tateana* much more resembles *vitrea* than *vitreoides* does.

The less common species, *T. vitreoides*, T.-Woods, is orbicular in outline varying to subpentagonal oval, the beak is almost flush with the umbo of the brachial valve, the foramen is very large and circular; young shells of eight millimetres diameter are the counterparts of the adults, which have the following measurements :—Transverse diameter, 24; longitudinal diameter, 26; sectional diameter, 12; diameter of foramen, 3 x 4 mm.

T. vitreoides resembles *Terebratella Tepperi*, and it is highly probable that Johnston and Pritchard have erroneously so named it.

Young and old shells of *T. Tateana* and *T. vitreoides* have proved on dissection to belong to Terebratula.

T. vitreoides differs from *Tateana* by its orbicular outline, absence of a mesial biplication, and the much abbreviated beak and larger foramen.

Localities.—Eocene—Aldinga Bay, Adelaide-bore, and River Murray Cliffs (South Australia); Muddy Creek, Gelibrand River, Mornington, Moorabool Valley, Corio Bay, Mitchell River, Shelford (Victoria).

Post-Eocene.—Spring Creek (Victoria), and Table Cape (Tasmania).

T. Aldingæ, *Tate*, **1**, p. 144.

Eocene.—Aldinga Bay, in the glauconitic limestone, S. Aust.; Cape Otway, Victoria (a doubtful identification); also New Zealand.

T. subcarnea, *Tate*, **1**, p. 144.

Eocene.—Chalk-cliffs, Great Australian Bight.

A very large Terebratulid occurs in the indurated clays of the Aldingian Section; the specimens are invariably much crushed, but the best and only specimen in the collection indicates a much compressed lenticular shell, with an almost circular marginal out

line of about 70 mills. diameter, and a thickness of 20 mm. (but it will be probably a little more in a perfect specimen). The surface is smooth, the growth-folds few and somewhat lamellar, and imbricating at the sides; the test is thick, as much as 2 mm. in the umbonal region, and densely punctate. On account of the thickness of test, probably, there is no external indication of a mesial septum. It may be a very large form of *T. subcarnea*, but if it be a *Magellania*, then it is new, and I suggest for it the name *M. cyclica*. It cannot be an extremely large *M. insolita*, which is the only Australian species that makes an approach to it, but that shell is elongate-oval, the beaks attenuated and suberect, exposing a broad and high deltidial area, and a small foramen, in contrast with the circular outline, stout incurved beak, and a moderately-sized foramen.

Genus Magellania, *Bayle*, 1880 (*nomen mutandum*).

Waldheimia, King, 1849, non Brullé, 1846.

M. corioensis, *McCoy*, 1877 ; *id.*, *Tate*, **1**, p. 156.

Eocene.—Mannum (S. Aust.); Corio Bay, Muddy Creek, Mornington (Vict.). Post-Eocene.—Spring Creek near Geelong (Vict.).

M. (?) Crouchii, *T. Woods*, 1865 ; *id.*, *Tate*, **1**, p. 153.

Eocene.—Mount Gambier (S. Aust.).

M. (?) divaricata, *Tate*, **1**, p. 149.

Eocene.—River Murray Cliffs at Mannum (S. Aust.); Moorabool and Spring Creek (*Hall* and *Pritchard*).

M (?) fimbriata, *Tate*, 1880, **1**, p. 150.

Eocene.—Aldinga Bay (S. Aust.); Cape Otway (Vict.).

M. furcata, *Tate*, **1**, p. 148.

Eocene.—Moorabool Valley (*Hall* and *Pritchard*), Cape Otway (Vict.); Aldinga Bay and Port Vincent (S. Aust.).

M. Garibaldiana, *Davidson*, 1862; *id.*, *Tate*, **1**, p. 146.

Eocene.—River Bremer near Callington, River Murray Cliffs, Croydon-bore 1,000 ft. (S. Aust.); Muddy Creek, Gelibrand River, Mornington, Moorabool Valley, Corio Bay, Airey's Inlet and Shelford (Victoria).

Post-Eocene.—Table Cape (Tasmania).

M. grandis, *T.-Woods*, 1865; *id.*, *Tate* **1**, p. 152.

Eocene.—River Murray Cliffs and Mount Gambier (S. Aust.); Shelford and Maude (Vict.).

Post-Eocene.—Table Cape (Tasmania).

M. gravida, *Suess*, Voy. Novara, Palæont., p. 56, t. 9, fig. 5 (*Waldheimia*).

Waldheimia concentrica, Hutton, Cat. Tert. Moll., N.Z., p. 35, 1873.

Terebratula (?) bulbosa, Tate, **1**, p. 145.

Professor Hutton writes me, "I think that *T. Tayloriana*, Colenso, Tasmanian Jour. of Science, 1844, is the same." However, that name cannot be employed as it was preoccupied in *Terebratula* by Lea, 1841.

Eocene (?).—Edithburg, St. Vincent Gulf (S.A.).

Eocene (Oamaru Formation).—New Zealand.

M. insolita, *Tate*, **1**, p. 151, t. 9, f. 6*b*. (non. 6*a*).

Waldheimia tapirina, Hutton, Cat. Tert. Moll., N.Z., p. 36, 1873.

Hutton's name is virtually a *nomen nudum*, as the diagnosis is absolutely devoid of specific characters, and is unaccompanied by a figure.

Eocene.—Mount Gambier, Aldinga Bay, and Adelaide-bore (S.A.); Muddy Creek, Camperdown, Gelibrand River, Cape Otway, Morington, Corio Bay, Bairnsdale (Vict.); also New Zealand.

Post-Eocene.—Spring Creek (Victoria).

M. Johnstoniana, *Tate*, **1**, p. 151.

Eocene.—Aldinga Bay (South Australia).

M. MacLeani, *Tate*, **1**, p. 153.

Eocene.—River Murray Cliffs at Murbko (S. Aust.); Moorabool Valley (Vict.), *teste* Hall and Pritchard.

M. pectoralis, *Tate*, **1**, p. 157.

Eocene.—Aldinga Bay and Happy Valley (S. Aust.).

M. sufflata, *Tate*, **1**, p. 157.

? Waldheimia triangulare, Hutton, *op. cit.*, p. 36, 1873.

Eocene.—Aldinga Bay, coast cliffs from Port Vincent to Stansbury (S. Aust.); possibly also New Zealand.

M. Tateana, *Tate*, **1**, p. 150.

This species simulates *Terebratula Tateana*, T.-Woods, to which I had wrongly referred it, but the figures and diagnosis furnished by me belong to the present species and not to that of Woods. The generic distinctions for each cannot be called in question.

Eocene.—Aldinga Bay; Port Vincent, Stansbury and Muloowurtie, Yorke-Pen. (South Australia). Gelibrand River (Victoria).

M. Taylori, *Etheridge*, 1876; *id. Tate*, **1**, p. 155.

Eocene.—River Murray Cliffs near Morgan (South Australia).

M. Vincentiana, *Tate*, **1**, p. 154.

Waldheimia gravida, Hutton, Cat. Tert. Moll., N.Z., p. 36, 1873 (non Suess).

Eocene.—Port Vincent on Yorke Peninsula (South Australia), also New Zealand (Oamaru Formation).

Genus Terebratulina, *D'Orbigny*, 1847.

T. catinuliformis, *Tate*, 1896, T. Roy. Soc., S. Aust., p. 130, *nom. mut.*

T. Davidsoni, Etheridge, 1876; *id.* Tate, **1**, 158, non Boll, 1856; non King, 1871.

Eocene.—River Murray Cliffs, Aldinga Bay, Port Vincent and Stansbury, Mount Gambier, Croydon-bore near Adelaide (968—1,230 ft.), Mulgurdawa-bore near Wellington (213 ft.), (South Australia); Muddy Creek, Moorabool Valley, Birregurra, Shelford (Victoria).

Post-Eocene.—Beaumaris (Cheltenham) and Spring Creek (Victoria); Table Cape (Tasmania).

T. lenticularis, *Tate*, **1**, p. 159.

Eocene.—River Murray Cliffs, Aldinga Bay, Adelaide-bore, and Muloowurtie near Ardrossan (S. Aust.); Muddy Creek and Corio Bay (Victoria). Waurn Ponds (*Hall* and *Pritchard*).

T. Scoulari, *Tate*, **1**, p. 158.

Terebratella Suessi, Hutton, Cat. Tert. Moll., N.Z., 1873, p. 37.

Eocene.—River Murray Cliffs, Aldinga Bay, Adelaide-bore, Kingscote (Kangaroo Island), Muloowurtie (S. Aust.); Muddy Creek, Gelibrand R., Mornington, Maude (*Hall* and *Pritchard*), Corio Bay, Moorabool Valley, Shelford and Camperdown (Victoria); also New Zealand (Oamaru Formation).

Post-Eocene.—Table Cape (Tasmania).

Hutton's definition does not contain a single specific character; it will apply equally well to any of the species of the *caput-serpentis* group; moreover, the generic reference is absolutely wrong.

T. triangularis, *Tate*, **1**, p. 159.

Eocene.—Aldinga Bay and Chalk-cliffs of the Great Australian Bight (S. Aust.); Cape Otway (Victoria).

Genus Terebratella, *D'Orbigny*, 1847.

T. furculifera, *Tate*, **1**, p. 161.

Eocene.—Chalk cliffs of the Great Bight, Aldinga Bay, and Adelaide-bore (S. Aust.); also New Zealand.

The specimens from the Great Bight, incorrectly referred to *Waldheimia insolita*, prove on dissection to belong to *Terebratella* and to the species *furculifera*. They are adult, as indicated not only by greater size than the type, but by the large development of the deltidial pieces, which have coalesced to form a broadly triangular area, medially and axially ridged, thus reducing the

foramen to a relatively small circular aperture. Height, 25 length, 22·5; sectional diameter, 10·5 mm.

T. (?) pentagonalis, *Tate*, 1, p. 161.

Eocene.—Aldinga Bay (S. Aust.).

T. Tepperi, *Tate*, 1, p. 160.

Eocene.—"Muloowurtie Clays," near Ardrossan, Yorke Peninsula (S. Aust.).

T. Woodsii, *Tate*, 1, p. 161.

Post-Eocene.—Table Cape (Tasmania); Spring Creek (Victoria), *teste*, Hall and Pritchard.

I have collected a few examples of a terebratulid which is evidently the shell attributed to *Magellania corioensis*, McCoy, by Tenison-Woods, and my tentative reference of it to *Terebratella* proves to be correct; as it possesses a loop very similar to that of *T. furculifera*, though the diverging portions of it are minutely and distantly toothed on the margin. The largest specimen measures:—Transverse and longitudinal diameters, 12; sectional diameter, 5·5 mm.

Terebratella, *sp.*

A unique specimen from the Eocene clays at Cape Otway, Victoria, consisting only of the umbonal portions of both valves in apposition, and displaying the interior, indicates a species related to *T. Tepperi*, but with much inflated valves of an elongate-oval shape in marginal outline.

Terebratella pumila, *spec. nov.* Pl. viii., fig. 1.

The largest of three specimens from the Miocene at the Gippsland Lakes is of a somewhat circular outline, 5 mills. in diameter, depressedly convex, and its front margin slightly depressed. It has the large foramen of *Terebratella*; the interior displays a low mesial septum rising high into the interior at its anterior extremity in about the centre of the valve, and showing on it traces of lateral rods. (The specimen has been sacrificed to gain this knowledge.) It is most certainly distinct from any described species, and is of interest as being the first indication of a Palliobranchiata in our Miocene deposits.

[*T. Gaulteri* (Morris), Hutton, Cat. Tert. Moll., N.Z., p. 37, 1873, of the Oamaru Formation proves on dissection to be a *Rhynchonella*.]

Genus Magasella, *Dall*, 1870.

M. compta, *Sowerby*, 1845; *id.*, *Tate*, 1, p. 162.

Eocene.—River Murray Cliffs at Mannum; near Callington; Parrikie Well, 60 miles east of Cook's Plains; Muloowurtie, Port Vincent, and Stansbury, Yorke Peninsula (South Austr.).

Muddy Creek, Gelibrand River, Maude, Mitchell River, Camperdown, Moorabool Valley, Portland (*Woods*), Port Fairy (*Strezlecki*) (Victoria).

Post-Eocene.—Beaumaris and Spring Creek (Victoria).

M. deformis, *Tate*, 1, p. 165.

Eocene. — Aldinga Bay, Muloowurtie, Kangaroo Island (South Australia).

M. lunata, *spec. nov.* Pl. viii., figs. 3-3*a*.

Eocene.—Croydon-bore, near Adelaide, at from 400 to 1,230 feet; River Murray Cliffs at Mannum; Mulgurdawa-bore, near Wellington, at 213 ft. (South Australia). Belmont near Geelong (Vict.)

Shell small, surface smooth or with a few distant depressed growth-folds, largely and copiously punctated (visible under a pocket lense) about 250 pores in a field of 1·1 mills. diameter; suborbicular to subpentagonally oval in marginal outline, plano-convex in sectional outline; hinge-line arched, not so long as the greatest width of the shell.

Pedunculated valve medially elevated, its front margin indented by a deep, narrow, concave sweep corresponding with the medial elevation. The beak is of moderate size, hardly up-curved, its truncated foramen being nearly flush with the umbonal area of the brachial valve; foramen of moderate size.

Brachial valve flat except towards the front, where it is abruptly depressed in the middle line.

The internal characters are the same as in *M. deformis*, the septum reaches nearly to the opposite valve.

Dimensions of an average-sized specimen. — Length, 5·5; height, 6; sectional diameter, 2·5 mills.

The species is related to *M. deformis*, but differs by more orbicular outline, stout and short beak, larger foramen and flat brachial valve. It simulates *Terebratella Woodsii*, but its anterior depression is shallower and more abrupt. The numerous examples, all of a nearly uniform size, from the Croydon-bore should dispel the doubt that they are young forms of *M. Woodsiana*, which does not occur there.

M. Tenisoni, *Woods*, 1865; *id.*, *Tate*, 1, p. 165.

Eocene.—Mount Gambier (S. Aust.) and Portland (Vict.) [*Woods*].

M. Woodsiana, *Tate*, 1, p. 163.

Eocene.—River Murray Cliffs, Mount Gambier, Aldinga Bay (S. Australia); Muddy Creek, Gelibrand River, Mornington, Birregurra, Moorabool Valley, Camperdown, Airey's Inlet (Victoria).

Post-Eocene.—Table Cape (Tasmania).

Mr. G. B. Pritchard, Proc. Roy. Soc. Vict., 1896, p. 143, has reduced this species to a synonym with *M. compta* on the grounds that "there are so many gradations between them;" this is not my experience. The main distinctive characters of *M. compta* are the straight hinge-line and the tendency to biplication at the front.

FAMILY THECIDIIDÆ.

Genus Thecidium, *Defrance*, 1828.

T. australe, *Tate*, 1, p. 166.

Eocene.—Muddy Creek (Victoria).

FAMILY RHYNCHONELLIDÆ.

Genus Rhynchonella, *Fischer*, 1809.

R. Baileyana, Tate, 1885, quoted from the Miocene locality, Jemmy's Point, Gippsland Lakes, is not Australian. My surmise of its mesozoic origin is confirmed by Mr. R. Etheridge, jun., who attributes it to the Cretaceous of Faxoe.

R. squamosa, *Hutton; id. Tate*, 1, p. 166.

Eocene.—River Murray Cliffs, Aldinga Bay, and Muloowurtie, near Ardrossan (South Australia); Muddy Creek, Maude (*Hall* and *Pritchard*), Waurn Ponds near Geelong (Victoria); also New Zealand.

Post-Eocene.—Table Cape (Tasmania).

Rhynchonella (?) tubulifera, *spec. nov.* Pl. viii., figs. 4-4*a*.

Eocene.—Muddy Creek (Victoria).

Shell lenticular, suborbicular or transversely quadrate-oval in marginal outline; cardinal margin arched, anterior and posterior margins rounded, front margin nearly straight. Pedunculate valve depressedly convex; beak bluntly and shortly pointed, straight, and declinous from the hinge; foramen broadly triangular, large, margined by two suberect narrow-lanceolate deltidial pieces.

The ornament of the valves consists of rounded radial costæ, increasing in numbers by repeated bifurcation, forty or more slightly serrating the margin; there they are a little wider than the subconcave furrows. The ribs are surmounted by stout truncated tubular spines, sufficiently close together to be almost imbricating. Interior unknown.

Dimensions.—Length, 7·5; height (incl. beak), 6·75; sectional diameter, 2·5 mm.

One example obtained by Mr. J. Dennant from the polyzoal rock at Muddy Creek.

Observations.—I had considered this unique fossil to belong to

Terebratulina, and as a list name *T. tubulifera*, new sp., it appears in "Report Austral. Ass. Adv. Sc.," vol. II., p. 442, 1890, but the beak, foramen, and ornament suggest an affinity with *Rhynchonella squamosa*. Nevertheless, it presents externally certain resemblances to other genera, and its correct systematic position must be deferred till other specimens are discovered. Of *Rhynchonella squamosa* I have no juvenile specimens with which to make comparison; but the adult of it has usually not more than half the number of ribs. The tubular spines may be viewed as the result of fusion of the margins of vaulted scales, which are so characteristic of *R. squamosa*, but in this new species the concentric lamella do not pass across the furrows as in the other species; moreover *R. tubulifera*, if juvenile, is indicative of a much less gibbous shell in the adult stage.

FAMILY CRANIIDÆ.

GENUS CRANIA, *Retzius*, 1781.

C. quadrangularis, *Tate*, 1893, Proc. Roy. Soc., N.S. Wales, p. 191, t. 11, f, 12-12*a*.

EOCENE.—Muddy Creek, WAURN PONDS, and Maude (Victoria).
POST-EOCENE.—Table Cape (Tasmania).

INDEX TO PALLIOBRANCHIATA.

[The names of genera are printed in small caps, those of valid species in Roman type, all synonyms in *Italic* type].

Aldingæ, Tate (Terebratula).
Australe, Tate (Thecidium).
Bulbosa, Tate=Magellania gravida.
Catinuliformis, Tate (Terebratulina).
Cœlata [McCoy] Woods=Rhyn. squamosa.
Compta, Sowerby (Magasella).
Compta, Woods=Magellania Garibaldiana.
Compta, Etheridge=Magasella Woodsiana.
Concentrica, Hutton=Magellania gravida.
Corioensis, McCoy (Magellania).
Corioensis, Woods=Terebratella Woodsii.
CRANIA, Retzius.
Crouchii, Woods (Magellania).
Cyclica, Tate (Terebratula).
Davidsoni, Etheridge=Terebratulina catinuliformis.
Deformis, Tate (Magasella).
Divaricata, Tate (Magellania).
Fimbriata, Tata (Magellania).
Furculifera, Tate (Terebratella).
Gambierensis, Etheridge=Magellania grandis.
Garibaldiana, Davidson (Magellania).

Gaulteri, Morris (*Terebratula*) is a Rhynchonella.
Grandis, Woods (Magellania).
Gravida, Suess (Magellania).
Gravida, Hutton=Magellania Vincentiana.
Imbricata, Woods=Magellania Garibaldiana.
Insolita, Tate (Magellania).
Johnstoniana, Tate (Magellania).
Lenticularis, Tate (Terebratulina).
Lucida (McCoy) Woods=Rhyn. squamosa.
Lunata, Tate (Magasella).
MacLeani, Tate (Magellania).
Macropora, McCoy=Magellania Garibaldiana.
MAGASELLA, Dall.
MAGELLANIA, Bayle.
Pectoralis, Tate (Magellania).
Pentagonalis, Tate (Terebratella).
Pumila, Tate (Terebratella).
Quadrangularis, Tate (Crania).
RHYNCHONELLA, Fischer.
Scoulari, Tate (Terebratulina).
Squamosa, Hutton (Rhynchonella).
Subcarnea, Tate (Terebratula).
Suessii, Hutton=Terebratulina Scoulari.
Sufflata, Tate (Magellania).
Tapirina, Hutton=Magellania insolita.
Tateana, Woods (Terebratula).
Tateana, Tate (Magellania).
Taylori, Etheridge (Magellania).
Tayloriana, Colenso=Magellania gravida.
Tenisoni, Woods (Magasella).
Tepperi, Tate (Terebratella).
TEREBRATELLA, D'Orbigny.
TEREBRATULA.
TEREBRATULINA, D'Orbigny.
THECIDIUM, Defrance.
Triangulare, Hutton (?)=Magellania sufflata.
Triangularis, Tate (Terebratulina).*
Tubulifera, Tate (Rhynchonella ?).
Vincentiana, Tate (Magellania).
Vitreoides, Tate=Terebratula Tateana.
Vitreoides, Woods (Terebratula).
Waldheimia, King=MAGELLANIA.
Woodsiana, Tate (Magasella).
Woodsii, Tate (Terebratella).

* Has priority to *T. triangularis* [Eth.], Davidson, 1884=*Terebratula striata, var. triangularis*, Etheridge, 1881.

CLASS PTEROPODA.

Bibliographical References.

1. Tate, "Pteropods of the Older Tertiary of Australia," in Trans. Roy. Soc., S. Aust., vol. IX., 1887.
2. Harris, "Tertiary Mollusca of Australasia," British Museum Publication, 1897.

Genus Limacina, Lamarck, 1819.

Spiralis, Eydoux and Souleyet, 1840.

L. tertiaria, *Tate.*

Spiralis tertiaria, Tate, **1**, p. 196.
Limacina tertiaria, Harris, **2**, p. 19.
Eocene.—Muddy Creek and Mornington (Victoria).

Genus Styliola, *Lesueur*, 1825.

S. annulata, *Tate*, **1**, p. 195.
Eocene.—Adelaide-bore.

S. bicarinata, *Tate*, **1**, p. 195.
Eocene.—Muddy Creek, Victoria.

S. Rangiana, *Tate.* **1**, p. 194.

Clio (Styliola) Rangiana, Harris, **2**, p. 20.
Eocene.—Muddy Creek and Mornington.

Genus Vaginella, *Daudin*, 1800.

V. eligmostoma, *Tate*, **1**, p. 195 : *id.*, *Harris*, **2**, p. 21.

Mr. Harris gives the result of a comparison of the specimens of this species and *V. depressa* of the Bordeaux basin, a resemblance that I had noted, which justifies the retention of *V. eligmostoma* for the Australian fossil.

Eocene.—Muddy Creek, Gelibrand River, and Mornington (Victoria).

Genus Hyalea, *Lamarck*, 1799.

Hyalea, *sp.*

Eocene at Mornington.

As yet only one example is known to me, but most unfortunately it broke to pieces on immersion in water to free it from the clayey-matrix, and before I had investigated its specific relationships.

CLASS SCAPHOPODA.

Bibliographical References.

1. Tate, "Scaphopods of the Older Tertiary of Australia," in Trans. Roy. Soc., S. Aust., vol IX, 1887.
2. Harris, "Tertiary Mollusca of Australasia," British Museum Publication, 1897.
3. Sharp and Pilsbry, in "Tryon's Manual Conchology," vol. XVII., 1898.

FAMILY DENTALIIDÆ.

The characters, viz., the presence or absence of an apical slit or notch or of an apical plug, which have been utilised for the genera of the family, have lately been shown to be more or less adventitious, and, therefore, they can be employed only for mere classificatory convenience ; hence *Entalis*, as previously employed by me in a generic sense, merges into *Dentalium*. However, I adopt Pilsbry's arrangement of the groups, though I degrade his subgenera to sections, as a convenient method of contrasting our species.

Genus Dentalium, *Linnæus.*

Section Dentalium (*sensu stricto*).

Shell longitudinally ribbed at least posteriorly, apex without slit or notch.

This group is unrepresented in the Older Tertiaries, unless *D. bifrons* should eventually prove to be without an apical slit or fissure.

Section Fissidentalium, *Fischer*, 1885.

Shell longitudinally ribbed at least near the apex, a long apical slit.

D. bifrons, *Tate*, 1, p. 192 ; *id.*, *Harris*, 2, p. 295.

Post-Eocene.—Spring Creek (Victoria).

Miocene.—Muddy Creek (Victoria).

The apex is still unknown, and therefore the location of the species in this section or in the foregoing is uncertain.

D. Mantelli, *Zittel*, 1864 ; *id.*, *Tate*, 1, p. 190 ; *id.*, *Harris*, 2, p. 293.

Eocene.—River Murray Cliffs and Aldinga Bay (S. Aust.) ; Bellarine Pen. (Hall and P.), Muddy Creek, Gelibrand River, Mornington, Corio Bay, Birregurra, Moorabool Valley, Camperdown, Shelford, Cape Otway (Victoria) ; also New Zealand.

Post-Eocene.—Table Cape (Tasmania), and Spring Creek (Victoria.)

I am now able to pronounce on the specific distinction of *D. Mantelli* and *D. Kickxi*, Nyst (authentic examples of the latter from the Miocene at Boom, Belgium, I have under observation). Tasmanian examples of *D. Mantelli* were referred by Tenison-Woods to the Belgian species. I do not know to what group *D. Kickxi* belongs, but apart from any apical differ-

ences, *D. Mantelli* enlarges more rapidly, and the costation is acute, elevated, and regularly disposed, primary and secondary costæ alternating; in *D. Kickxi* the costations are broad, depressed, and irregularly disposed, anteriorly they are more numerous than in the Australian species.

D. latesuclatum, *spec. nov.* Pl. viii., fig. 9.

Shell nearly straight, nine-angled (rarely twelve-angled) of rapid increase, being about seven times as long as wide. Surface ornamented with nine (rarely twelve), strong, elevated ridges, which are somewhat compressed at the sides and roundly truncated atop; the ridges are somewhat irregularly disposed being closer together on the convex aspect and fewer on the concave aspect, they extend from the apex in undiminished strength to the oral aperture; the concave furrows at the apex are of about equal width with the ridges, thence they increase in breadth till at the oral aperture they are on the convex aspect from two to three times as wide as the ridges, and as much as four times on the concave aspect. The interstitial furrows in the basal portion may have a few longitudinal threads and striæ, and are traversed by sub-distant incremental lines which pass over the costæ.

Apex truncated with a long narrow slit on the convex face, no plug; the aperture is circular internally, polygonal externally; oral aperture with a thin acute margin (thus indicating a perfect shell) of a polygonal outline.

Length, 40; breadth of oral aperture, 6—7 mill.

Miocene.—In the basal clay-bed at Grange Burn near Hamilton, Victoria (nine examples).

Among species of the same section having a prominent polygonal transverse section the Grangeburn fossil makes a closer agreement with *D. striatum*, Lamarck, as figured by Deshayes, Mon. Dentale, than with any other, but it is abbreviated in length and is broader, has nine ridges, not twelve to fourteen. There are, however, some species in Section Dentalium (restricted) which offer some similitude, such as *elephantinum*, *aprinum*, &c. It is not likely to be mistaken for *D. Mantelli* with its numerous and slender ribs, which are evanscent at the anterior one-third or thereabouts.

Section Graptacme, *Pilsbry* and *Sharp*, 1897.

Surface sculptured with close, fine, deeply engraved, longitudinal striæ near the apex.

D. sectiforme, *spec. nov.* Pl. viii., figs. 6-6*a*

Shell small, very slender, very little tapering, slightly arched, translucent-white and shining. Sculpture of very numerous,

close, subequal riblets extending longitudinally from apex for about three-fourths of total length of shell. The riblets become faint at about half the total length, where appears fine annular sculpture; the anterior one-fourth with fine annular sculpture. Aperture circular with an acute peristome. Apex with a straight, short, narrow slit on the convex side; apical orifice contracted by a plug deeply and widely cleft from the convex to the concave side,

Length of shell, 11 to 13; diameter of aperture, 1; height of arch from chord, 1·25 mm.

Miocene.—Muddy Creek (Victoria).

In Pilsbry's arrangement of the recent Dentaliums, this fossil species falls in the "Group of *D. sectum*" of the Section Graptacme. In slenderness and curvature it approximates to the two species including in the group, nearer to *calamus* than to *sectum* by the longitudinal striæ extending nearly to the aperture; from both it is distinguished by the prominent annular sculpture of the anterior portion of the tube.

Section Lævidentalium, *Cossmann*, 1888.

Shell smooth with annular growth lines.

a. Apex with a short slit or triangular notch.

D. subfissura, *Tate*, 1, p. 191; *id.*, *Harris*, 2, p. 296.

Apical fissure a short triangular notch with a plug in the type example.

Eocene.—River Murray Cliffs and Aldinga Bay (S. Aust.); Bellarine Pen. (Hall and P.), Muddy Creek, Gelibrand River, Mornington, Corio Bay, Belmont, Camperdown, Shelford, Maude, Cape Otway (Victoria).

Post-Eocene.—Spring Creek (Victoria).

Dentalium pictile, *spec. nov.* Pl. viii., fig. 8.

Shell slender, about thirteen times as long as wide, much arched, smooth, without any trace of striæ, dark coloured with lighter-coloured oblique bands. Apex about one millimetre in the lateral diameter, slightly less in the concavo-convex diameter, with a short and broad notch on the convex side; there are traces of a plug.

Length, 52; breadth of oral aperture, 4; height of arch from chord, 6 mills.

Post-Eocene.—Table (Cape Tasmania).

Previously listed by Tate and Dennant, Correlation Papers, III., 1896, as *D. subfissura.* I separate this species from *D. subfissura*, because of its greater curvature, not so slender at the apex, which is elliptic, and not circular in sectional outline.

D. largiereseens, *spec. nov.* Pl. viii., figs. I0-10*a*.

Shell smooth and shining, considerably arched, six and a-half times as long as wide, rapidly increasing; sculptured with distinct, oblique, incremental lines; apical fissure a short slit or triangular notch on the convex side, no plug; anterior extremity circular.

Length, 44; diameter of anterior extremity, 6·5; at apex, 1; height of arch above the chord, 2 mills.

This new species resembles *D. subfissura*, from which it differs by stronger curvature, by rapid increase, not so attenuated apically, and by the obliquely annular sculpture. The rapid increase in diameter and the strong curvature distinguish it also from recent species.

Post-Eocene.—Beaumaris (six exs.).

Miocene.—Junction-bed, Grange Burn (one ex.); Gippsland Lakes (one ex., J. Dennant).

b. Apex simple, without notch or slit.

D. lacteolum, *spec. nov.*

D. lacteum, Tate, **1**, p. 193, non Deshayes.

A reference to the full description and ample illustrations of *D. lacteum*, Deshayes, in Pilsbry's monograph of the genus, satisfies me that this recent species is not present in our Older Tertiaries. The transverse section of both is circular, but the rate of increase of the sectional diameter is not the same; thus in *D. lacteum*, with a total length of 30 mm., the diameter is 2·5, whilst in the fossil species for a length of 35 mm. the diameter is 2·25 (vix); hence *D. lacteolum* is a more slender shell. It is straighter and more slender than the posterior part of *D. subfissura*, and is therefore somewht similar to *D. acriculum*, from both distinguished, of course, by the absence of an apical notch.

Tenison-Woods recorded *D. lacteum (?)* as a Table Cape fossil, but the only *Lævidentalium* at that locality, so far as known from my own and other collections, is *D. pictile*, which I am disposed to regard as the shell observed by him.

Eocene.—Muddy Creek and Gelibrand River, Victoria.

Section Fustiaria, *Stoliczka*, 1868.

Shell smooth, or with annnlar sculpture; slit long.

D. acriculum, *Tate*, **1**, p. 192; *id.*, *Harris*, **2**, p. 296.

Shell curved, slender, smooth.

Eocene.—Muddy Creek, Victoria.

D. australe, *Sharp* and *Pilsbry*, **3**, p. 192.

Entalis annulatum, Tate, **1**, p. 191. Name preoccupied by Gmelin, by Sandberger, and by Meyer.

Shell large, nearly straight, with annular lines.

Eocene.—Muddy Creek and Shelford, Vict.

Post-Eocene.—Spring Creek, Vict.

A variant of this species occurs at Spring Creek, which is usually more slender, the length to the breadth being 12 to 1, as against 10 to 1; and in one individual the apical slit is 18 millimetres.

Section Episiphon, *Pilsbry* and *Sharp*, 1899.

Apex entire with a projecting tube.

a. Shell longitudinally ribbed.

D. aratum, *Tate*, **1**, p. 192; *id.*, *Harris*, **2**, p. 293.

This species has a truncated apex of about one millimetre diameter from the orifice of which protrudes a very short, smooth subpellucid tube. The truncated end is of a white ceramic lustre and is concentrically striate; the whole appearances suggest that the embryonic and attenuated tip has been cast off. *D. aratum* differs from all congeners in the group by its longitudinal ornament and sculpture.

Eocene.—River Murray Cliffs and Muloowurtie, S. Aust.; Bellarine Pen. (Hall and Pritchard), Muddy Creek, Gelibrand River, Fyansford, Birregurra, Mornington, Camperdown, Cape Otway (Victoria).

Post-Eocene.—Spring Creek.

b. Shell with annular ridges.

D. tornatissimum, *spec. nov.* Pl. viii., figs. 7-7*a*.

Shell very small, nearly straight; sculptured with annular rounded ridges, more or less regular throughout the whole length (here and there a stouter annulation of about double breadth), wider than the deep narrow intervening grooves, ten in a millimetre length of the apical part.

Test very thick. Apex simple, circular, truncate; projecting from the aperture is a round pipe about ·16 in diameter and ·2 mm. long. Anterior extremity not known; all the specimens present the appearance of being fragments of larger individuals; however, the transverse section is circular.

Length 7, diameter at aperture ·9, at apex ·55 mill.

Miocene.—Gippsland Lakes (4 exs., J. Dennant).

This species is closely related to *D. tornatum*, Watson, dredged off Levuka in 12 fms. (Challenger Exped.), which is distinguished from other components of Pilsbry and Sharp's subgenus *Episiphon* by its annular grooves. *D. tornatum* is described as possessing deep, close-set, slightly oblique, annular grooves in the upper part of the shell only, becoming shallower further down and cease at last rather abruptly. The fossil analogue has the

grooves, not at all oblique or very slightly so, equally strong at the anterior as at the posterior extremity, but on the other hand the fossil is, so far as known, only about half the length of the living species. I am afraid comparison of actual specimens can only decide if there be differences in the number of the annulations for equal units of length, as the figures and description by Watson do not afford a sufficiency of detail on this head. Nevertheless, it is stated that the flat bands are of variable widths, and increase with the growth of the shell from about 0·011 inch to twice that amount, a description that does not apply to the fossil; and, moreover, the test is so thick that translucency can hardly have belonged to it.

SECTION GADILINA, *Forresti*, 1895.

Apex entire, shell subtriangular in section.

D. Tatei, *Sharp* and *Pilsbry*, **3**, p. 218 (*nom. mutand.*).

D. triquetrum, Tate, **1**, p. 193; non Brocchi, 1814.

EOCENE.—ADELAIDE-BORE.

FAMILY SIPHODENTALIIDÆ.

GENUS CADULUS, *Philippi*, 1844.

C. muconatus, *Tate*, **1**, p. 193; *id.*, *Harris*, **2**, p. 297.

EOCENE.—MUDDY CREEK (Victoria).

POST-EOCENE.—Spring Creek (Victoria).

SECTION GADILA, *Gray*, 1847.

C. acuminatus, *Tate*, **1**, p. 194; *id.*, *Pilsbry*, **3**, p. 183, t. 32, figs. 47-49.

MIOCENE.—Aldinga Bay (S. Aust.)

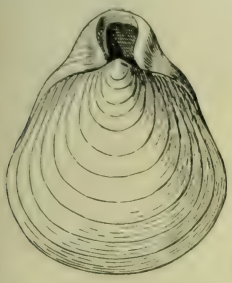
RECENT.—SOUTH AUSTRALIA and N. S. Wales.

Mr. Pilsbry, *op. cit.*, very justly remarks that the species name is inappropriate, though it is appropriate as applied to the perfect shell. It happens that the apical half or so is deciduous, and certainly the decollated portion, which is the part generally known, cannot be called acuminate. As regards this interesting phase of the Cadulus-shell, I leave to Dr. Verco to make more fully known, as the material in his possession is more thoroughly illustrative than what I possess.

However, I borrowed the name after Deshayes, who, on the authority of Angas, had so attached his MS. name to New South Wales specimens in the British Museum, and Angas so listed the species for South Australia on the testimony of examples forwarded by me. (Proc. Zool. Soc., 1878, p. 868).

C. infans, *spec. nov.* Pl. viii., fig. 11.

Similar to *C. acuminatus* (Pl. viii., fig. 12), though words can hardly convey those differences which the eye can appreciate. The shell



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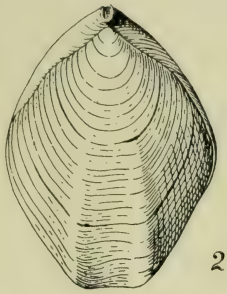

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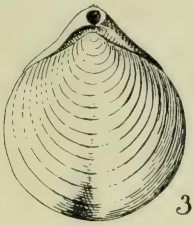

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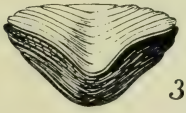

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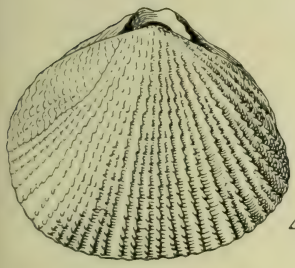

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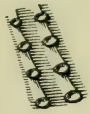

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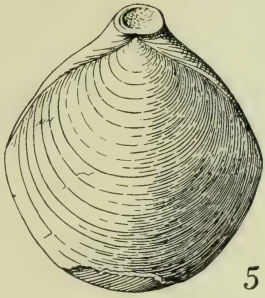

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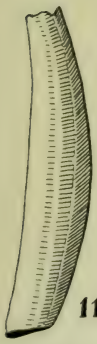

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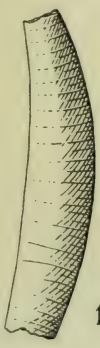

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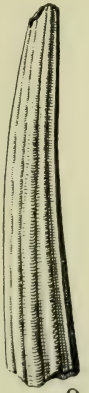

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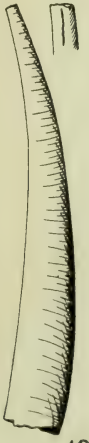

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10a

is slightly swollen in the anterior one-third on the convex side, thence gradually tapering to each end; the convex side is not so arched as in *C. acuminatus*, whilst in contrast with *C. infans*, in which the shell tapers from its greatest diameter, the shell of *C. acuminatus* has an almost uniform diameter throughout, until very near the extremities a slight decrease in diameter is observable. Apertures circular and their margins acute.

Length.—3·2 mills.

Miocene.—Muddy Creek (one ex.).

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[The names of genera or subgenera are printed in small capitals; those of valid species in Roman type; all synonyms in italic type.]

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CLASS LAMELLIBRANCHIATA.

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1. Tate, "Lamellibranchs of the Older Tertiary of Australia," Part I., in Trans. Roy. Soc., S. Aust., vol. VIII., 1886.
2. Tate, *id.*, Part II., *op. cit.*, vol. IX., 1887.
3. Tate, "Unrecorded Genera of the Older Tertiary Fauna of Australia," Journ. Roy. Soc., N.S. Wales, vol. XXVII., 1894.
4. Harris, "Tertiary Mollusca of Australia," British Museum Publication, 1897.

FAMILY OSTREIDÆ.

Genus Ostrea, *Linnaeus*, 1758.

O. arenicola, *Tate*, **1**, p. 97; *Harris*, **4**, p. 300.

Miocene.—*Aldinga Bay*, Murray Cliffs (S. Aust.); Gippsland Lakes and Shelford (Vict.), doubtful identifications.

O. hyotidoidea, *spec. nov.*

O. hyotis, Tate, **1**, p. 96, pl. vi., fig. 5; Harris, **4**, p. 229; non Linnaeus.

Now that I have examples of *O. hyotis* for comparison with the fossil oyster of our Eocene beds, which I had tentatively referred to that living species, I am induced to regard the two as distinct. The fossil species is more depressed, more irregular in outline; the radial ridges less elevated and obtuse, whilst the foliaceous scales very rarely develop into tubular spines; at the same time its restriction to Eocene strata implies specific distinction.

Eocene.—*River Murray Cliffs* and Aldinga Bay (S. Aust.); Muddy Creek, Mornington, Moorabool Valley (*Hall* and *Pritchard*), and Shelford (Vict.).

Post-Eocene.—Table Cape (Tasm.).

O. manubriata, *Tate*, **2**, p. 184; *Harris*, **4**, p. 300.

Miocene.—*Muddy Creek* (Vict.).

O. Sturtiana, *Tate*, **1**, p. 97; *Harris*, **4**, p. 299.

Miocene—*River Murray Cliffs* (S. Aust.).

EXCLUDED SPECIES.

O. hippopus, Tate, **1**, p. 98, name preoccupied by Lamarck, 1818, is, I think, an individual monstrosity of *Gryphæa tarda*.

Subgenus Gryphæa, *Lamarck*, 1801.

G. tarda, *Hutton*, 1873; *id.*, *Tate*, **1**, p. 98; *Harris*, **4**, p. 302.

Ostrea hippopus, Tate, 1886.

Eocene.—Aldinga Bay, Witton Bluff, Chalk-cliffs of the *Great Bight* (S. Aust.); Muddy Creek, Cape Otway, Shelford (Vict.); also New Zealand.

Post-Eocene.—Spring Creek (identification doubtful).

FAMILY DIMYIIDÆ.

GENUS DIMYA, *Rouault*, 1850.

D. dissimilis, *Tate*, **1,** p. 100; *Harris*, **4,** p. 306.

EOCENE.—R. Murray Cliffs, Aldinga Bay, Muddy Creek, Gelibrand River, Mornington, Birregurra, Corio Bay, Moorabool Valley and Bellarine Peninsula (*Hall* and *Pritchard*), Camperdown, Shelford, Cape Otway, Maude.

POST-EOCENE.—Beaumaris and Spring Creek (Vict.); Table Cape (Tasm.).

D. sigillata, *Tate*, **1,** p. 100; *Harris*, **4,** p. 306.

EOCENE.—*Aldinga Bay* (Turritella-marls).

FAMILY ANOMIIDÆ.

GENUS PLACUNANOMIA, *Broderip*, 1832.

P. Ione, *Gray; id.*, *Tate*, **1,** p. 101; *Harris*, **4,** p. 303.

EOCENE.—Fyansford and Muddy Creek, doubtful identifications; Corio Bay.

POST-EOCENE.—Spring Creek (Vict.).

MIOCENE.—Aldinga Bay and River Murray Cliffs (S. Aust.); Muddy Creek and Gippsland Lakes (Vict.).

RECENT.—S. Australia, Tasmania, and New Zealand.

P. sella, *Tate*, **1,** p. 102; *Harris*, **4,** p. 304.

EOCENE.—*R. Murray Cliffs* (S. Aust.); Muddy Creek, Mornington, and Shelford, Waurn Ponds (*Hall* and *Pritchard*); also New Zealand.

POST-EOCENE.—Spring Creek (Vict.); Table Cape (Tasmania).

GENUS ANOMIA, *Linnaeus*, 1758.

A. (?) cymbula, *Tate*, **1,** p. 101.

EOCENE.—*Aldinga Bay* (Glauconitic limestone).

FAMILY PECTINIDÆ.

GENUS PECTEN, *Muller*, 1776.

P. antiaustralis, *Tate*, **1,** p. 106; *Harris*, **4,** p. 315.

MIOCENE.—*Adelaide*, Aldinga Bay, and Edithburg (S.A.); Muddy Creek, Gippsland Lakes, and Shelford (V.).

P. consobrinus, *Tate*, **1,** p. 104; *Harris*, **4,** p. 317.

MIOCENE.—*Aldinga Bay.*

——— var.

EOCENE.—Aldinga Bay, Shelford, Maude and Belmont, Waurn Ponds (Hall and Pritchard).

POST-EOCENE.—Spring Creek.

P. palmipes, *Tate*, **1,** p. 105; *Harris*, **4,** p. 318.

MIOCENE.—*Aldinga Bay* and Edithburg (S. Aust.).

P. subbifrons, *Tate*, 1882; *id.*, **1**, p. 104.

Eocene.—Aldinga Bay and Shelford, Waurn Ponds (Hall and Pritchard).

Miocene.—Aldinga Bay, *Adelaide* (S.A.).

P. subconvexus, *Tate*, **2**, p. 185.

Miocene.—*Muddy Creek*, but possibly derived from Eocene.

P. Aldingensis, *Tate*, **1**, p. 109.

Eocene.—*Aldinga Bay* and Stansbury (S. Aust.).

P. dichotomalis, *Tate*, **1**, p. 106.

Eocene.—Bellarine Pen. (*Hall* and *Pritchard*), *Mornington*, Gelibrand River (Vict.).

P. Eyrei, *Tate*, **1**, p. 107; *Harris*, **4**, p. 318.

Eocene.—*Aldinga Bay* (S. Aust.); Moorabool Valley and Maude (*Hall* and *Pritchard*) (Vict.).

P. Flindersi, *Tate*, **1**, p. 108.

Eocene.—*Aldinga Bay* and Muloowurtie near Ardrossan (S.A.).

P. Foulcheri, *Woods*, 1865; *id.*, *Tate*, **1**, p. 111.

Eocene.—R. Murray Cliffs and *Mount Gambier* (S.A.); Bellarine Pen. and Maude (*Hall* and *Pritchard*), Muddy Creek, Mornington, Moorabool Valley, Cape Otway, Shelford (V.).

Post-Eocene.—Spring Creek (V.); Table Cape (T.).

P. Gambierensis, *Woods*, 1865; *id.*, *Tate*, **1**, p. 112.

Eocene.—*Mount Gambier* (S.A.); Moorabool Valley (Hall and Pritchard), (V.).

Post-Eocene.—Spring Creek near Geelong (V.).

P. Murrayensis, *Tate*, **1**, p. 105; *Harris*, **4**, p. 314.

Eocene.—*R. Murray Cliffs* (S.A.); Muddy Creek, Moorabool Valley, Shelford (Vict.).

Post-Eocene.—Spring Creek (V.).

P. Peroni, *Tate*, **1**, p. 108; *Harris*, **4**, p. 317.

Eocene.—*Aldinga Bay* (S.A.); Waurn Ponds (*Hall* and *Pritchard*), Western Beach, Corio Bay (V.).

P. polymorphoides, *Zittel*, 1864; *id.*, *Tate*, **1**, p. 113; *Harris*, **4**, p. 316.

Eocene.—River Murray Cliffs (S.A.); Muddy Creek, Gelibrand River, and Shelford, Waurn Ponds (*Hall* and *Pritchard*), (V.); also *New Zealand*.

Post-Eocene.—Spring Creek (V.).

P. Sturtianus, *Tate*, **1**, p. 109; *Harris*, **4**, p. 315.

Eocene.—*River Murray Cliffs* (S.A.); Waurn Ponds (*Hall* and *Pritchard*), Muddy Creek, Bairnsdale, Shelford (V.).

Post-Eocene.—Spring Creek.

Miocene.—Muddy Creek (probably derived).

P. Meringæ, *spec. nov.**

MIOCENE.—*Gippsland Lakes* (V.).

Shell suborbicular in marginal outline, equilateral, inequivalve, radially ribbed, ribs in five groups, ears large.

Riyht valve of about 50 mm. diameter, moderately inflated, ventral margin undulating corresponding with the areas occupied by the five groups of primary radial ribs and their intervening concave furrows. Primary ribs stout, flatly convex, with precipitous sides, about 18, variously grouped in twos, threes, and fives, forming elevated radial folds; the intervening concave areas with one or two slender ribs; the whole surface covered with close-set, slender, undulating, concentric liræ, more or less lamellose on the primary ribs (ten in a length of one mm. at the front on the medial line). Anterior ear large, falcate, with three or four radial riblets, crossed by concentric liræ forming slight squamæ on the riblets and terminating in a serrated crest on the dorsal margin. Posterior ear of less size, right-angled triangular, ornamented with fine concentric liræ.

Left valve flat, the ornament similar to, but alternating with, that of the inflated valve; the anterior ear has, however, stouter riblets, and the transverse liræ rise into erect lamelliform scales.

An adult left valve of 95 mm. diameter has five broad elevated rays, the ribs of which are finally evanescent, whilst the riblets in the interstitial furrows are not so pronounced as in the medium-sized valves.

Dimensions of the figured shell.—Antero-posterior diameter, 40; ventro-dorsal diameter, 35; thickness through both valves, 10 mm.

The name of the species perpetuates that of an aboriginal locality whence the fossils have chiefly been obtained.

This species is separated from the *bifrons*-group by the absence of shagreen sculpture; the clustering of the ribs into sets allies it to *polymorphoides* among our fossil forms, and to *undulatus* and related species among living species of the *Janira*-group. It differs from *polymorphoides*, its nearest ally, by the regular convexity of the inflated valve, and by the distinct equilaterality of the shell.

SPECIES EXCLUDED.

P. spondyloides, Tate, 1886=SPONDYLUS ARENICOLA.

P. deformis, Tate, 1887, is a worn HINNITES CORIOENSIS.

SECTION PSEUDAMUSSIUM, *H.* and *A. Adams*, 1855.

Surface smooth, no internal ribs.

* The illustrations of this and other species diagnosed in the following pages are deferred to the issue of the concluding part of the "Revision of he Lamellibranchiata."

P. Hochstetteri, *Zittel*, (*sp.*), 1861 ; *id.*, *Tate*, **1**, p. 114.

P. (*Pseudamussium*) *Hochstetteri*, Tate, P.R. Soc., N.S.W., vol. XXXI., p. 408, 1898.

Eocene.—River Murray Cliffs, Mount Gambier, Aldinga Bay, Adelaide-bore, Stansbury, and Muloowurtie (South Australia) ; Muddy Creek, Shelford, Camperdown, and Airey's Inlet (Victoria) ; also *New Zealand.*

Post-Eocene.—Spring Creek, Vic.; Table Cape, Tas.

Section Propeamussium, *DeGregorio*, 1883.

Valves with dissimilar ornament, smooth or radially striate, no internal ribs.

P. Yahlensis, *Woods* (*sp.*), 1865 ; *id.*, *Tate* **1,** p. 110.

Pseudamussium Yahlensis, Harris, **4,** p. 322.

P. (Pseudamussium) Yahlensis, Tate, P.R. Soc., N.S.W., vol. XXXI., p. 408, 1898.

Pecten Hectori, Hutton, Cat. Test. Moll., N.Z., p. 30, 1873.

Eocene.—River Murray Cliffs and *Mount Gambier* (S.A.) ; Bellarine Pen. and Moorabool Valley (*Hall* and *Pritchard*), Corio Bay, Muddy Creek. Gelibrand River, Mornington, and Bairnsdale (Victoria) ; also New Zealand.

Post-Eocene.—Beaumaris, Vic.; Table Cape, Tas.

Genus Amussium, *Megerle*, 1811.

Valves with dissimilar ornament.

A. Zitteli, *Hutton* (*sp.*), 1873 ; *id*, *Tate*, **1**, p. 115 ; *Harris*, **4**, p. 324.

Eocene.—River Murray Cliffs, Aldinga Bay, and Mount Gambier (S.A.) ; Bellarine Pen. (*Hall* and *Pritchard*), Muddy Creek, Gelibrand River, Mornington, Fyansford, and Cape Otway (Victoria) ; also *New Zealand.*

Post-Eocene.—Table Cape, Tasmania.

Section Pleuronectia, *Swainson*, 1840.

Valves smooth.

A. lucens, *Tate*, **1,** p. 115.

Post-Eocene.—Spring Creek, Victoria.

Miocene.—*Aldinga Bay*, S. Australia.

Genus Hinnites, *Defrance.*

H. Corioensis, *McCoy*, 1879 ; *id.*, *Tate*, **1,** p. 116.

H. trailli, Hutton, Cat. Tert. Moll., N.Z., p. 32, 1873. *Pecten deformis*, Tate, **2**, p. 185.

Hutton's diagnosis contains no specific characters, and the name should be regarded as invalid.

Eocene.—Waurn Ponds, Moorabool Valley and Maude (*Hall* and *Pritchard*), Muddy Creek, *Corio Bay*, Bairnsdale (V.) ; River Murray Cliffs (S.A.) ; also N.Z. (Pareora Formation).

Post-Eocene.—Table Cape (T.).

The valve on which was founded *P. deformis*, and recorded as Miocene, has all the appearance of a derived origin.

FAMILY LIMIIDÆ.

Genus Lima, *Lamarck*, 1789.

L. Bassii, *Woods*, 1877; *id.*, *Tate*, **1**, p. 117; *Harris*, **4**, p. 310.

Eocene.—River Murray Cliffs, Aldinga Bay, Adelaide-bore (S.A.); Bellarine Pen. (*H.* and *P.*), Muddy Creek, Gelibrand River, Mornington, Belmont, Cape Otway, Maude, Shelford (V.); also N.Z.

Post-Eocene.—*Table Cape* (Tasmania).

L. linguliformis, *Tate*, **1**, p. 118; *Harris*, **4**, p. 310.

Eocene.—Belmont (*H.* and *P.*), *Muddy Creek*, Mornington (V.).

Post-Eocene.—Table Cape (Tasmania).

L. polyactina, *Tate*, **1**, p. 118.

Eocene.—*Adelaide-bore.*

Section Limatula, *S. Wood*, 1839.

L. Jeffreysiana, *Tate*, 1884; *id.*, **1**, p. 119; *Harris*, **4**, p. 311.

Lima bullata [Born], Hutton, Cat. Tert. Moll., N.Z., p. 33, 1873; non Born.

Eocene.—River Murray Cliffs, Aldinga Bay, Mount Gambier (S.A.); Waurn Ponds (*H.* and *P.*); Muddy Creek, Mornington, Shelford (V.); also New Zealand [Oamaru Formation].

Post-Eocene.—Spring Creek (V.); *Table Cape* (T.).

Miocene.—Edithburg, Aldinga Bay, River Murray Cliffs (S.A.); Muddy Creek (V.).

L. subnodulosa, *spec. nov.*

Test stout; shell inflated, slightly inequilateral (the posterior side being a little protuberant in the middle line). Ornamented with 25 stout, rounded ribs, which are somewhat nodulose anteriorly; the narrower interstices are crossed by moderately stout threadlets.

This species has the aspect of a *Limea*, but there are no traces of teeth.

Dimensions.—Umbo-ventral diameter, 4·5; antero-dorsal diameter, 3·5; height of valve, 1·75 mm.

Miocene.—Muddy Creek, Victoria (one ex.). The shell is somewhat polished, evidently by erosion, and may have been derived from the underlying Eocene.

L. polynema, *Tate*, **1**, p. 119.

Eocene.—Adelaide-bore.

L. crebresquamata, *spec. nov.*

Shell considerably inflated with a prominent umbo which arches over the hinge-line. Hinge-line straight, narrow, the shell widening thence to about two-thirds of the total length, thence slightly narrowing to the arched front.

Radial ribs about 50, subacute, beset with suberect squamæ which are sometimes denticuliform; they extend down the sides of the ribs, but do not cross the furrows; the squamæ are close-set, and often subimbricate. The furrows are not so wide as the ribs, and appear to be inornate.

Dimensions.—Umbo-ventral diameter, 12; antero-posterior diameter, 8; length of hinge-line, 4; thickness through both valves, 10 mm.

Post-Eocene.—Spring Creek, Vict. (three examples).

Genus Limea, *Brown*, 1831.

L. alticostata, *Tate*, **1**, p. 119.

Eocene.—Adelaide-bore.

L. transenna, *Tate*, **1**, p. 119; *id. Harris*, **4**, p. 313.

Eocene.—Mount Gambier, S.A.; Bellarine Pen. (*Hall* and *Pritchard*), *Muddy Creek*, Mornington, and Shelford (Victoria).

Post-Eocene.—Table Cape, Tasmania.

L. multiradiata, *spec. nov.*

Shell moderately inflated with a pointed central umbo; subinequilateral, the umbo-ventral axis slightly oblique; wings slightly developed. The surface of the valves ornamented with numerous flatly-rounded smooth ribs (about ten to one mm. of width in the medial area), separated by flat, equally wide or slightly wider furrows; the furrows are ornamented by transverse, close-set, slender threadlets.

There are six teeth on each half of the hinge-line and its decurrent portions on the anterior and posterior side; those nearest the ligamental pit are oblique, the others are somewhat transverse.

Dimensions.—Length of hinge, 2; umbo-ventral diam., 5·25; antero-posterior diam., 5 mm.

Eocene.—" Turritella-marls," Aldinga Bay (six exs.).

This species resembles *L. transenna*, but has not the marked obliquity of that shell, and, moreover, the ribs are more numerous, with narrower interstitial furrows, and the transverse threadlets are finer and closer together.

FAMLY SPONDYLIIDÆ.

GENUS SPONDYLUS, *Linnaeus*, 1758.

S. gaderopoides, *McCoy*, 1876; *id.*, *Tate*, **1**, p. 121; *Harris*, **4**, p. 307.

EOCENE.—Aldinga Bay (Glauconitic limestone), Yorke-Peninsula, chalk-cliffs of the Great Bight (S.A.); Maude (*H.* and *P.*), Gelibrand River, Bairnsdale (V.).

POST-EOCENE.—Spring Creek (V.); Table Cape (T.).

S. pseudoradula, *McCoy*, 1877; *id.*, *Tate*, **1**, p. 121; *Harris*, **4**, p. 308.

EOCENE.—River Murray Cliffs (S.A.); Bellarine Pen. (*H.* and *P.*), Muddy Creek, Gelibrand River, Mornington, Moorabool Valley, Shelford, Bairnsdale (V.).

POST-EOCENE.—Beaumaris (V.); Table Cape (T.).

S. arenicola, *Tate*, Aust. Assoc. Adv. Sc., vol. VI., 1896, p. 318.

Pecten spondyloides, Tate, **1**, p. 19, t. 4, fig. 6, non fig. 7.

Spondylus Aldingensis, Tate, 1896, T. Roy. Soc., S.A., vol. XX., p. 121.

MIOCENE.—*Aldinga Bay* (S.A).

Pecten spondyloides having been ascertained to have all the interior characters proper to *Spondylus*, it seemed necessary to change the specific name, as *Spondylus spondyloides* is hardly a binomial form, hence the names *arenicola*, *Aldingensis*. These two names were applied about the same time, though the first appeared earlier in print, and a lapse of memory is the sole reason for using the latter.

S. Murravicus, *Tate*, 1899.

Pecten spondyloides, var., Tate, **1**, t. 4, fig. 7.

EOCENE.—River Murray Cliffs at *Mannum*, S.A.

GENUS PLICATULA, *Lamarck*.

P. ramulosa, *Tate*, 1898, Proc. Roy. Soc., N.S.W., vol. XXXI., p. 408, t. 19, fig. 3.

POST-EOCENE.—*Table Cape* (Tasmania).

FAMILY PTERIIDÆ.

GENUS PTERIA, *Scopoli*, 1777.

[*Avicula*, Bruguière; adopted from Klein, 1753, a pre-Linnæan name.]

P. nasuta, *Tate*, **1**, p. 121.

EOCENE.—*Adelaide-bore*.

GENUS MARGARITIFERA, *Brown*, 1789.

Meleagrina, Lamarck, 1812.

M. crassicardia, *Tate*, **1**, p. 121 ; *Harris*, **4**, p. 325.

Eocene.—R. Murray and Muddy Creek.
Miocene.—*River Murray Cliffs* (S.A.).
Older Pliocene.—Dry Creek-bore, near Adelaide.

Genus Vulsella, *Lamarck*, 1799.

V. lævigata, *Tate*, **1**, p. 122; *Harris*, **4**, p. 326.

Eocene.—*Aldinga Bay* (Glauconitic limestone).

Genus Melina, *Retzius*, 1781.

[*Perna*, Bruguière, 1792.]

M. sp., *Tate*, 1886.

Eocene.—Aldinga Bay (S.A.); also Oamaru formation, New Zealand. From both localities known only as casts.

Melina percrassa, *spec. nov.*

Shell oblong-cuneate, somewhat oblique, equivalved, not winged; test very thick and perlaceous.

Hinge line, inner margin straight, outer-margin convex; deepest anteriorly (22 mm.), eight to nine moderately deep ligamental furrows, marked by arched transverse striæ, two millimetres, more or less, in width, slightly narrower than the interstitial concave areas.

Anterior margin slightly incurved at the summit of the byssal sinus (the left valve has a slight expansion superiorly), slightly convex in alignment with byssal sinus, thence roundly sloping to the ventral margin, which is narrowly rounded; posterior margin with a slight outward-curving slope. The byssal sinus is in the left valve, very long (30 mm.) and narrow (2 mm. at its widest).

Surface of valves marked by the somewhat crowded edges of imbricating lamellæ.

Dimensions.—Hinge line, 42 mm. long; umbo-post-ventral diameter, 80; sectional diameter, 32 mm.; greatest thickness of test, 15.

Habitat.—Junction-bed of the Miocene at Grangeburn, near Hamilton, Victoria (two pairs of valves in apposition).

This species offers no distinctive features, except perhaps in respect of its convex dorsal margin and its excessively thick test, which, after all, may only be the result of extreme age. It has some analogy with *P. Lamarcki* of the Parisian Eocene.

FAMILY PINNIIDÆ.

Genus Pinna, *Linnæus*, 1758.

P. semicostata, *Tate*, **1**, p. 122.

Miocene.—*Aldinga Bay* (S.A.).

P. cordata, *Pritchard*, 1895, Proc. Roy. Soc., Victoria, vol. VII., p. 228, t. xii., figs. 4, 5.

Eocene.—*Moorabool Valley* (*Pritchard*).

P. sp., *Tate*, 1886.

Eocene.—River Murray Cliffs (S.A.); Muddy Creek and Cape Otway (V.).

Known only by fragments of the apical part of the valves; a different species from either of the above is indicated thereby, but the material is insufficient for determinate diagnosis.

FAMILY PHILOBRYIIDÆ.

Genus Philobrya, *P. Carpenter*, 1872.

P. Bernardi, *Tate*, 1898. This Journal, vol. XXII., t. 4, f. 10, p. 88.

Eocene.—Muddy Creek, *Belmont*, and Shelford (V.).

P. prænuntia, *Tate*, 1898, *op. cit.*, t. 4, f. 9, p. 88.

Eocene.—*Cape Otway* (V.).

(To be continued).

Notes on and Description of the Male of Cœlostoma immane (Maskell), and of a New Species of a Leaf-mining Moth.

By J. G. O. Tepper, F.L.S., F.I.Sc., &c.

[Read October 3, 1899.]

Coelostoma immane, *Maskell.*

The female of *Cœlostoma immane*, one of the Monophlebidæ, is probably the largest sized of all Coccids, was first figured and described by the late F. M. Maskell in the Transactions of the New Zealand Institute, 1891 (p. 49, pl. XI., figs. 9—12), and afterwards mentioned repeatedly in subsequent volumes up to 1898. The male has, however, remained unknown hitherto, it seems, although it is mentioned by Maskell that the species was reported as having been observed near Sydney on some kind of Eucalypts. Nor was the precise locality known where the original type specimens in the South Australian Museum had been collected, as they were received without any note or indication, except a half-obliterated postmark indicating the Far North. Both these points are now cleared up by a parcel of specimens received at the S.A. Museum on September 5th of this year, having been sent by Mr. George Prout from the Wheal Turner Mine, in the neighbourhood of the Yudanamutana and Umberatana Stations, north of Port Augusta, to Prof. R. Tate, who courteously handed them over to the Museum Collection.

Some six or seven females, fixed to the twigs of *Acacia aneura* (Mulga), were still fresh, and some of them actually alive. They were of various sizes, the largest measuring 35 mm. in length, and 17 mm. in width; but with them were also about twice as many males enclosed, which were, however, all dead, and unfortunately, more or less distorted and damaged. There were likewise a quantity of eggs which had been deposited *in transitu*.

The antennæ of the females are stout, ten-jointed, 9 mm. long, gradually attenuated from the base to the apex, the joints subcylindrical, and each apparently with a narrow white annulus at the base. The body segments are distinctly separated by more or less deep constrictions; hence the margin is sinuate, besides being otherwise sculptured above with mature individuals, the young ones being almost smooth and entire in this respect. The whole body in life is covered thinly with a mealy-white layer of wax, which also covers the twigs and foliage near the specimens, and appears not to be dissolved by strong methylated spirit. In formaline solution the wax forms a more or

less contiguous mass, and separates in larger or smaller flakes imperfectly. When this occurs, the whole of the epidermis is then seen to be marked by minute round pits, from which the waxy meal appears to be exuded. The general colour is a deep blackish-brown, here and there verging into lurid.

Mr. Maskell placed the species in the genus Cœlostoma "on account of the absence of a rostrum" (op. cit. p. 51). and says "there is no doubt of its being a Monophlebid," but it appears that this "absence" is only apparent in the Monophlebidæ, for both *Monophlebus Crawfordi* and *Cœlostoma australe* are known to possess a rostrum (sucking tube) of great length, which during life is deeply buried in the tissues of the bark of the twigs on which the insect is located. When, however, the organ is withdrawn it is at the same time retracted into the body; its extreme slenderness and the minuteness of the otherwise unmarked orifice rendering it next to impossible to detect its presence. Mr. A. Zietz informs me that he has frequently detached living Monophlebi from the bark and seen their rostrum retracted, and I have noticed in the present instance that the living insect (Cœlostoma) had its body closely and immovably fixed to the twig by its rostrum, but later, when dead, had its forepart raised and the rostrum completely retracted. The "absence" of a rostrum, as a distinction, will, therefore, have to be omitted in future.

The male of *C. immane* is very insignificant in size compared with that of the female, and is provided with two ample wings of similarly simple structure as those of *C. australe*. The body is usually black, also the legs, but more or less covered by the thin whitish meal already mentioned, which also dusts the wings and antennæ of the specimens.

The head contracts posteriorly into a distinct neck. The eyes are brown, large, oval, and provided with very numerous, extremely minute facets. The antennæ are shortly hirsute (?), notably the two apical joints, 12-jointed; the basal joint is very short, much thicker than long, cup-shaped, the second similiar, but thinner and longer; joints 3, 8, 9 sub-cylindrical, sub-equal, each about twice the length of the second; joints 4-7 and 10 filiform, subequal, each about twice as long as the preceding; 11 and 12 similar, subequal, together a little longer than the preceding one, the penultimate being the shorter.

The thorax is uneven, shiningly black; the mesonotum exhibits an oval raised median space convex above; scutellum indistinct.

Abdomen rugose, flat, 6 (?) jointed, acuminate, and terminating in a slender, flat filament (? penis) twice or more longer than the body (this is usually absent from dried specimens, or more or less contorted, owing to its extreme slenderness and brittle nature).

The anterior wings are large, rose-coloured, oval, and about two and a-half times longer than wide, but very thin and brittle.

The costal nervure (vein) is very strong, acuminate from the middle, and terminating towards the apex, colour brownish-black, base pink ; the main branch vein starts from the costal nervure at about one-third of its length from the base ; terminating beyond the middle of the hindmargin, and is dark coloured and prominent above ; the second branch is close to the first and parallel with it, but is very fine, pale coloured and *prominent on the underside ;* the cubital nervure is short, also very fine, pale coloured and midway between the costal vein and the hindmargin ; the membrane itself is translucent, rose coloured, and, in dried specimens, the superior surface resembles certain parts of the skin of the human finger, the depressed fine lines branching from the nervures.

The legs are black, smooth, the anterior much shorter than the second and third pairs, which are much longer than the body, the middle pair being the longest. Femora more or less dilated, tibia linear, tarsi entire (?), claw simple, minute.

The ova are elongate oval, ends subequal, colour orange-red, length 1 mm., diameter 0·5 mm., quite smooth as seen by means of the triple Coddington lens.

Strong methylated alcohol, in which most of the males and a portion of the ova were immersed, became of a pinkish-yellow colour in a few days, while a white paper label became dyed of a rose colour in the liquid.

Nepticula nigricansella, *sp. nov.*

Metallic brownish-black. Head with long, dense, erect bristles, dull black ; face and pronotum resplendent dark bronze in reflected light ; antennæ nearly as long as the folded wings, silvery towards apex ; forewings with three very narrow, nearly equidistant, metallic bluish-white bands ; hindwings black, tips brilliantly metallic ; body beneath metallic, blackish, with white hairs fringing the segments sparingly ; legs very long, black, with some indistinct pale bands. Length of body—Male, 1·5 mm.; female, 2 mm. Span of wings—Male, 4 mm.; female, 6 mm.

One male and two females, bred from leaves of *Kennedya* (Hardenbergia) *nigricans.* Habitat—Unley, Adelaide, S.A.

The leaves, presented on September 4 by Mr. W. H. Grasby, had the underside so completely mined by the larvæ that the entire epidermis became separated from margin to margin in most, and partially so in others. A tiny chrysalis being detected fixed to the upper (still green) part on one of the veins, the leaves were secured in a box with a glass lid. On September 15 the first imago was noticed, and on the 19th two more.

A portion of a Eucalyptus leaf from Mr. A. Zietz exhibits quite similar features, which give the foliage the aspect of being blistered, and shows that there are other species of these, the tiniest of Lepidoptera.

Descriptions of New Species of Corals from the Australian Tertiaries.

By J. Dennant, F.G.S., Hon. Member.

PART II.

With Plates IX.—X.

[Read October 3, 1899.]

In this communication the descriptions of species belonging to the family Eupsammidæ are continued.

Trematotrochus complanatus, *spec. nov.* Pl. ix., figs. 1*a*, *b*.

Corallum small, free, much compressed, especially inferiorly, and contracted slightly at the summit. In general outline it is a flattened cone, of which the laterally rounded base forms the apex. Calice shallow and elliptical, with its diameters in the ratio of 100 to 66.

Septa in six systems with three complete cycles. The primaries are the longest, and are very much stouter than the other orders. The secondaries are usually, but not always, longer and stouter than the tertiaries. All are exsert, entire, and beset laterally with long pointed granules, which give a serrated appearance to their upper margins; the central ends of some septa are also lobed. The primaries, which rise higher in the calice than the remaining septa, are convexly curved superiorly and then descend almost abruptly towards the elongate columella. This is formed of solid tissue with large nodules or papilli on its surface. It varies much in outline for different individuals, and is occasionally almost lamellar, though usually broad and spreading. It is depressed in the calice, but not greatly, and is fused just below its nodular surface to the primary, and still lower down to the secondary septa; its junction with the latter is, however, rarely visible except in worn examples.

The costæ curve inwards at the calice, and are then continued by the convexly curved and exsert septa. They are broad and prominent, especially at the margin, from which they gradually diminish in size to the base. The six primaries are plainly distinguishable on the wall, as they are not only slightly stouter than the secondaries and tertiaries, but also project above them at the margin. The primaries are free right to the base, where they are fused with each other, and also with the united secondaries and

tertiaries. These two orders join very near the base, each pair of tertiaries curving and meeting the enclosed straight secondary. The intercostal spaces are narrower than the costæ, and are crossed by slender transverse bars, between which a series of longitudinal openings or pores penetrate the wall. Towards the base of the corallum the pores become very small and barely distinguishable.

Height of corallum, 5 mm.; length of calice, 3 mm.; breadth of calice, 2 mm.

Localities.—Upper Eocene, Spring Creek (type); Middle Eocene, Muddy Creek.

Trematotrochus lateroplenus, *spec. nov.* Pl. ix., figs. 2*a*, *b*.

Corallum much like the preceding, but less compressed inferiorly. It is subcylindrical for a short distance from the base, and then expands so as to form a flattish cone with rounded lateral borders. Calice elliptical and shallow; its axes are in the ratio of 100 to 62.

Septa in six systems with four cycles, but the fourth cycle is developed only in the end systems which are correspondingly larger than those at the centre. As in *T. complanatus*, the six primaries are very stout, and rise above the general level of the calice. The secondaries and tertiaries are equal, and comparatively slender, while the quaternaries are, as a rule, smaller still. The latter are usually free, and the primaries uniformly so, but the secondaries and tertiaries in the lateral, and occasionally also in the central systems, are irregularly fused together close to the columella. The sides of all the septa are studded with sharply pointed granules, and their upper margins have consequently a dentate appearance. Some infilling of the interseptal spaces is due, I think, to the development of stereoplasma and not to true endotheca.

Columella elongate, irregular in outline, and tending to spread laterally in the fossa. Its upper surface is nodular, papillary, or even spongy in texture. It is fused, either directly or by means of thin processes, with the inner margins of the primary, secondary, and occasionally the tertiary septa.

Costæ broad, flat, and continuous with the septa. They are evenly placed round the border of the calice, the greater marginal extent of the four end systems giving room for the extra cycle of costæ developed in them. The base of the corallum is formed by the union of twelve costæ, of which the six primaries remain free to the summit. The secondaries are joined at a short distance from the base by the tertiaries, and these again in the lateral systems by the slightly shorter quaternaries. The intercostal spaces are narrow and regularly porous in the manner characteristic of the genus.

Height of corallum, 5 mm.; length of calice, 3 mm.; breadth of calice, 2 mm.

Localities.—Eocene; Shelford (type) and Muddy Creek, Victoria.

Genus Stephanophyllia.

Stephanophyllia implexa, *spec. nov.* Pl. x., figs. 1*a*, *b*, *c*, *d*.

The corallum is free, circular, and in shape like a crown, with convex upper surface and sub-plane base.

The septa rise almost vertically from the basal margin, and then arch round to a small, shallow, and elongate fossula. They are in six systems, with five complete cycles. The primaries are free and reach almost to the columella; two of them are in a line with this and straight, but the other four curve slightly from it just at their inner extremities. The secondaries are also straight, and equal in length to the primaries; at about three-fourths from the margin they are fused with the tertiaries, either directly or by means of synapticular laminæ; for the remaining one-fourth of their length their upper margins are lobed and deeply notched. The other orders of septa are straight for a short distance from the margin, but then describe a remarkable series of curves, each cycle finally uniting with that of the order immediately preceding. The tertiaries curve gently towards the secondaries but, before actually uniting with them, bend round and run parallel with them for some distance. The two quaternaries in each half system are unequal in length, that nearest the primary being much longer than the other. Both bend from side to side, and describe an irregular triple curve before joining the intervening tertiary at distances corresponding to their lengths. The quinaries curve towards and join the quaternaries, but in each half system all four differ in length. The first and third in order of length unite with the longer of the two quaternaries, and the second and fourth with the shorter. In the case of both sets of quinaries the shorter of the two is that adjacent to the tertiary septum. Near the wall the septa are slender and equal, but become stouter medially. Their upper margins are strongly serrated by a regular series of transverse granular projections with alternating shallow notches. The serrations are not confined to the edges of the septa, but can be traced vertically downward for a short distance till they gradually cease.

Not only are the septa from the second to the fifth, or highest order, connected in the manner described by a series of tortuous curves, but the chambers so formed are usually closed at their outer ends by synapticular processes which unite adjoining laminæ where the intervening spaces are narrowest. The whole calice

is thus subdivided into a large number of chambers, which are repeated symmetrically in the systems. One of my specimens, which has the upper margins of the septa worn down to the level of the synapticulæ, shows this structure of the calice very clearly. In his description of *Stephanophyllia complicata*, a recent species, Moseley calls attention to an analogous symmetrical arrangement of closed calicular chambers formed jointly by curved septa and synapticular processes. * As another instance I may quote *S. elegans*, Michelin, from the Italian Miocene.

The columella is elongate, papillary, and not very conspicuous. From a dissected specimen I judge it to be a fairly compact structure reaching to the base. Some of the secondary septa are joined to it in the specimens examined, but not the primary, which are, superficially at least, separate from it. Pali are not present.

The undersurface, or wall, is very slightly concave and barely projects beyond the superimposed crown-like calice. The costæ are thin, finely granular, well raised ridges, which radiate regularly from the centre to the circumference. At the central point a few costæ are irregularly fused together, but these immediately bifurcate, and so on successively till at the margin there are 96, or 16 in each system. Here they alternate with the septa, and extend just beyond them.

The whole undersurface of the corallum is fenestrated by stout transverse bars alternating with approximately circular holes arranged in regular series in the interspaces of the costæ. These openings or pores are largest at the margin and gradually diminish in size towards the centre. About 20 concentric rows of pores were counted in the large specimen figured.

Diameter of base, 11 mm.; height of corallum, 5 mm.

Locality.—Eocene, Spring Creek, 13 miles south of Geelong, Victoria. Five fairly perfect specimens and a fragment of a sixth.

The three species next to be described cannot be placed in any established genus. They possess the porous wall of the Eupsammidæ, but are defective in the incurving and lateral junction of the septa generally characteristic of that family. In some respects, and especially in the irregular development of their septa, they approach Milne-Edwards and Jules Haime's genera *Leptopsammia* and *Endopsammia*, each of which was founded upon a single recent species. They stand apart, however, from both, and I class them under the following new genus :—

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* Challenger Reports, Zoology, vol. II., pp. 198-201.

Genus Notophyllia, *nov.*

Corallum simple, free. Calice elliptical. Columellar lamellar and lobed, knobbed, or indented. Septa moderate in number, with irregular cyclical development; principal orders straight, and the fourth, if present, curved or not. Wall porous, and vermicular or granular. Costæ distinct. Epitheca partial or absent.

Notophyllia semivestita, *spec. nov.* Pl. ix., figs. 3*a*, *b*.

The corallum is compressed and tall in relation to its breadth. The anterior and posterior surfaces taper to a thin, laterally projecting, wedge-shaped base, above which the sides are slightly concave. About two-thirds of its upper surface is encircled by a stout banded epitheca, with one or two rudimentary bands below the main portion. Superiorly the epitheca terminates abruptly close to the summit of the corallum, and there stands out almost independent of the wall, being only connected with it by thin rod-like processes, which here and there cross the intervening space. Wall coarsely porous and highly vermicular. The costæ are broad and distinct, especially at the summit of the corallum, where, as prominent continuations of the septa, they fringe the calicular margin. Calice elliptical and superficially shallow with a deep fossa; its axes are in the ratio of 100 to 66. Columella deeply seated, stout, and lamellar, with a lobed upper surface.

Septa exsert and in six systems, with three complete cycles, and some of a fourth; the latter are developed only in the half systems at the extremities of the longitudinal axis; moreover, in the type calice one of these halfsystems shows no fourth cycle. All orders of septa are straight and free, with no sign of incurving in any. The primaries and secondaries are stout and subequal; the tertiaries and quaternaries are also subequal, but much smaller. The two first orders slope gently towards the axial fossa, and then descend abruptly, but do not unite with the columella. All the septa are coarsely granular; near the wall they are cellular, and occasionally perforate, but in the body of the calice they are solid, as well as symmetrically arranged laminæ.

Height of corallum, 15 mm.; length of calice, 8 mm.; breadth of calice, 6 mm.

Locality.—In the Eocene strata three miles west of Gellibrand River, on the south coast of Victoria. A solitary example, but so well preserved that I select it without hesitation as the type of the new genus.

Notophyllia gracilis, *spec. nov.* Pl. x., figs. 2 and 3*a*, *b*.

Corallum compressed and variable in height, usually short; some individuals are more compressed inferiorly than others.

The base may be concave, straight, or even convex between its lateral borders. Wall thin, granular, and perforated by numerous sub-circular irregularly scattered pores. There is no epitheca. Costæ broad, distinct, and continuous with septa.

The calice is elliptical and shallow superficially, with a deep fossa; the ratio of its major and minor axes is as 100 to 75.

The columella, which is deeply seated, is a slender, elongate, strongly incised, and perforated lamina. It rises vertically in the calice, and is free from the septa, except near its base, where the primaries are united with it by thin processes.

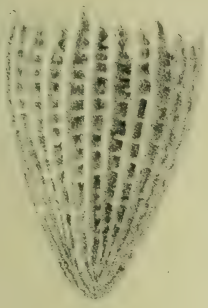
The septa are slender and unequal, with the primaries slightly stouter and longer than the secondaries; the tertiaries and quaternaries are very delicate laminæ, and do not extend far into the calice; all are granular, and sparely perforate near the wall; the convexly curved upper edges of the first two orders rise considerably above the margin of the calice. There are six well-marked systems of septa, but those at the ends of the calice are much larger than the more central ones, and show a correspondingly fuller development of the cycles; in the former, three complete cycles are present, and some of a fourth; but, as in *N. semivestita*, the highest cycle is undeveloped in the more central halves of the lateral systems. Normally, there is but a single septum, and that by its size evidently a tertiary, between each pair of the central primaries, but exceptionally, as in one of the calices figured, there are three, viz., a tertiary and two quaternaries. The quaternaries present in any of the systems usually bend towards and unite with the tertiary between them; these two orders of septa consist, however, of such short delicate laminæ that their junction is an inconspicuous feature of the calice. The two calices figured represent fossils from different localities, and serve to illustrate the variation observed in the species; their coralla are practically indistinguishable, and only the better preserved of them is drawn.

The coralla vary in height from 5 to 7 mm. Height of corallum figured, 6 mm. Diameters of type calice, 5·5 mm. and 4 mm. Diameters of calice in variety, 6 mm. and 4·5 mm.

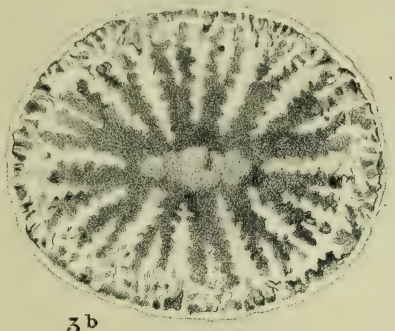
Locality.—Eocene; Shelford (type calice) many examples. Camperdown, Muddy Creek. The variety was collected by Mr Kitson at Altona Bay.

Notophyllia aperta, *spec. nov.* Pl. ix., figs. 4*a*, *b*.

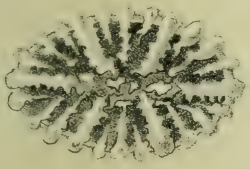
This coral somewhat resembles *N. gracilis* in shape, but is less compressed. The base is keeled, and either straight or concavely curved in the direction of its longer axis. The calice is elliptical and widely open, but not shallow; the relation of its major to the minor axis is as 100 to 83. Wall stout, vermicular, and highly porous; numerous pores are distinguishable on the in-



1a



3b



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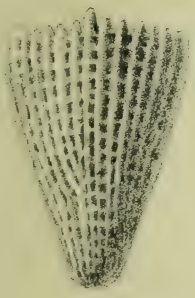
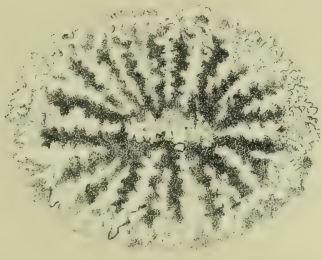
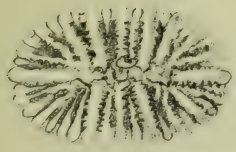
3a



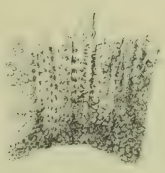
2a



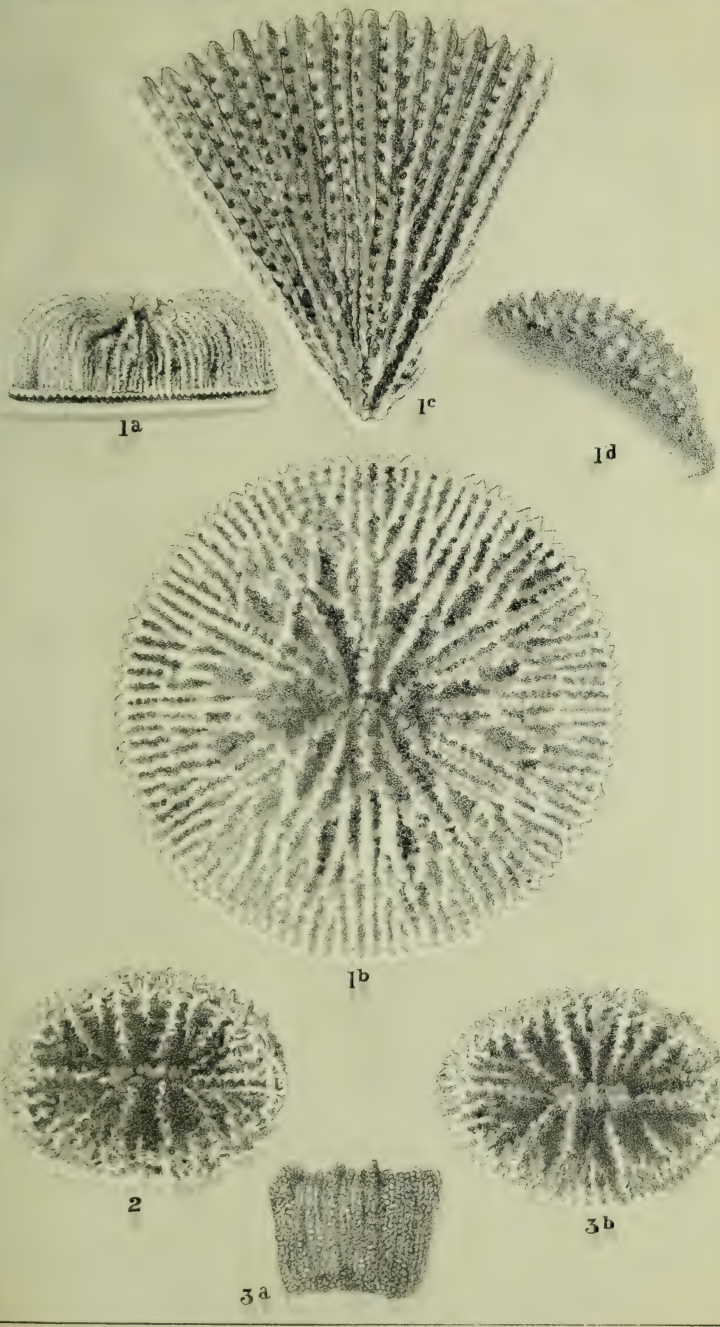
4b



2b



4a


1a
1c
1d
1b
2
3b
3a

terior as well as the exterior surface of the wall. There is no epitheca, and the costæ are broad, well marked, and continuous with the septa. The latter are at the wall broad and spreading, irregular in outline, occasionally branched, and very porous; their projections into the calice taper off, and are straight, free, sharply defined, and imperforate. There are six systems of septa with three complete cycles in those at the ends of the calice, but with two only in the central pair. The secondaries and tertiaries are subequal, and the primaries both longer and stouter; all three orders are exsert and coarsely granular.

The columella rises vertically from the bottom of the fossa, and forms the most conspicuous feature of the calice. It is straight and lamellar, of moderate length, and most irregular as to its surface, which is marginally indented, and laterally ridged, knobbed, and perforated. It is free from the septa except just at the base, where it is apparently connected by thin processes to the primaries.

Height of corallum, 6 mm.; length of calice, 6 mm.; breadth of calice, 5 mm.

Locality.—Eocene at Fyan's Ford, Geelong. One good example (the type) and another smaller and evidently young.

N. aperta is closely allied to *N. gracilis*, but may be distinguished from that species by its stouter wall, coarser septa, more conspicuous columella, and broader and more open calice. The absence of a fourth cycle of septa is, perhaps, unimportant. Possibly other examples may yet be found with this developed.

EXPLANATION OF PLATES.

Plate IX.

Fig.

1. *Trematotrochus complanatus*—*a*, corallum, 8 diam.; *b*, calice, 10 diam.
2. *Trematotrochus lateroplenus*—*a*, corallum, 8 diam.; *b*, calice, 10 diam.
3. *Notophyllia semivestita*—*a*, corallum, 2 diam.; *b*, calice, 6 diam.
4. *Notophyllia aperta*—*a*, corallum, 3 diam.; *b*, calice, 6 diam.

Plate X.

Fig.

1. *Stephanophyllia implexa*—*a*, corallum, 3 diam.; *b*, calice, 6 diam.; *c*, section of base, showing one system of costæ, 10 diam.; *d*, a primary septum, magnified.
2. *Notophyllia gracilis*—calice, 6 diam.
3. *Notophyllia gracilis*, var.—*a*, corallum, 3 diam.; *b*, calice, 6 diam.

Diagnoses of Four New Species of Plants from South Australia.

By Professor Ralph Tate.

[Read October 3, 1899.]

Minuriella annua, *Tate*, 1899.

Minuria annua, Tate, *m.s.*

In the following description of a new plant, I have embodied the results of a microscopic examination of the floral parts, which might have been omitted if the generic location did not admit of a doubt; but whereas the plant presents a new departure for the genus in respect of habit, it becomes desirable that those features relied on in the classification of the genera of the Tribe Asteroideæ should be correctly defined.

A dwarf glabrous annual, erect, up to one centimetre, slightly branched at the base; branches slender, compressed. Leaves somewhat fleshy, 30 to 35 mm. long, alternate; sessile slightly dilated and thin below, narrow linear above, obtuse at the tips. *Flower-heads* erect, singly and laterally disposed along the branches, leaf-opposed, about 7 mills. broad in the longer diameter; pedunculate on stalks up to 4 mills. long. *Involucre* campanulate; receptacle slightly convex, ellipsoid in marginal outline (the diameters as three to four). *Bracts* about 16, chiefly in one row with a few small exterior and basal ones, narrow-oblong, narrowed at the base and slightly dilated upwards, rounded at the tips; of thin texture, firm, but not coriaceous; medially green, with a translucent margin all round, which is more or less laciniate, or sometimes ciliate at the summit.

Ray-florets 20 to 30 anantherous. *Corolla-tube* as long as the pappus (3 mills.), filiform, green, the ligulate blade yellow, at first linear, expanding upwards into a spathulate or narrow oblong tip, nearly as long as the tubular portion. *Pappus* well-developed, 3 mills. long, and slightly exceeding the involucre, consisting of about 25 filiform bristles, not at all dilated at the base, equally strongly and closely denticulated throughout. *Style* linear-lanceolate; style-branches, a little longer than the style, filiform-cylindric (apparently without papillæ), included within the corolla-tube, or but slightly exsert. *Archenes* fertile, narrow-elliptical, attenuated upwards and there truncate; 2 mills. long, silky-hairy, especially on the margins.

Disk-florets bisexual, about 15 in. each head. *Corolla* tubular, filiform, but widening upwards; five-toothed (the segments short, broad, and acutely triangular). The *pappus* bristles more or less

connate to form a tube about the length of the corolla; a few bristles (similar to those of the ray-florets) extend beyond the tube for the whole length of the corolla. *Style* and style-branches nearly two times as long as the corolla; the style-branches nearly terete, with obtuse elongated clavate tips, papillose on the back. *Anthers* obtuse at the base. *Achenes* abortive.

Habitat.—Mount Lyndhurst Run near Farina, South Australia; discovered by Mr. Max Koch, who has had the species under observation for two flowering seasons.

The floral characters presented by this new plant are in the main proper to *Minuria;* and of the five species which are comprised in the genus (restrictively Australian), it makes some approach to *M. suaedifolia* by its yellow flowers and connate pappus of the disk-florets. But the species differs from all of them by its herbaceous habit, and more particularly by its lateral (not terminal) flower-heads; the long corolla-tube of the ray-florets is a further difference, though one of degree only, and therefore not of generic value.

Nevertheless, the species typifies a new section or subgenus, for which I propose the name MINURIELLA (diminutive of *Minuria*, in allusion to its dwarf and herbaceous habit).

GENUS ZYGOPHYLLUM.

Before proceeding to the diagnoses of certain new forms in the genus, I will make some general observations on those characters, presented by known species inhabiting Australia, which are employed in the discrimination of the species.

Mueller admits nine species, to which I add two; these may be grouped into two series on the differential characters afforded by the filaments, shape of capsule, and floral taxonomy.

Bentham, in "Fl. Aust.," I., p. 292, employed the first character to distinguish the primary subdivisions; Mueller, "Vict. Plants," the last; and I, in my "Flora S. Aust.," the second. The species included under these several schedules are as follows:—

FILAMENTS.

1. Basal part of filament winged.
   Apiculatum, glaucescens, crenatum, iodocarpum, prismatothecum, Kochii, hybridum.
2. Filaments subulate, not winged.
   Billardieri, ammophilum, fruticulosum, Howitti.

FRUITS.

1. Capsule obconic, truncate atop.
   Apiculatum, fruticulosum, ammophilum, Billardieri.
2. Capsule globulose, oval, or oval-oblong.
   Prismatothecum, Howitti, glaucescens, crenatum, iodocarpum, Kochii, hybridum.

FLORAL TAXONOMY.

1. Flowers pentamerous.
   Apiculatum, iodocarpum, Kochii, hybridum.
2. Flowers tetramerous.
   Glaucescens, crenatum, prismatothecum, Billardieri, ammophilum, fruticulosum, Howitti.

Further, the number of seeds in each cell of the capsules is variable; normally one-seeded in *apiculatum, iodocarpum, prismatothecum, Billardieri, fruticulosum;* normally two-seeded in *ammophilum;* normally three- to five-seeded in *glaucescens, crenatum, Kochii, hybridum.*

Again, the foliage conforms with one type, and consists of two leaflets terminating a short common petiole, which passes to a two-lobed leaf, in which the leaflets are continuous with the winged petiole (and in *Z. Howitti* the petioles become connate); this latter condition is a natural transition from the former one, and most of the species exhibit the two conditions. The shape of the leaflet is subject to variation in the majority of the species; the extremes suborbicular, obovate, cuneate, and linear-lanceolate. Micromorphs as regards the corolla are not infrequent.

I have been much concerned as to whether or not the phenomenon of hybridization or that of dimorphism could explain the differential characters of the two new species, but I think that a study of the following tabular summary of the chief differential characters among the Australian species should remove all doubts thereon. I may add that the new species have been under careful observations by Mr. Koch for at least two years, and upon an abundance of living material:—

—	Filaments.		Flowers.		Shape of Fruit.		Direction of Fruit.		Length of Stalks.*		No. Seeds in each Cell.		
	Winged.	Simple.	5-merous.	4-merous.	Obconic.	Not obconic.	Pendulous.	Erect.	Short.	Long.	1.	2.	3-6.
Apiculatum ...	*	-	*	-	*	-	*	-	*	-	*	-	-
Glaucescens ...	*	-	-	*	-	*	-	*	*	-	-	-	*
Crenatum ...	*	-	-	*	-	*	-	*	*	-	-	-	*
Iodocarpum ...	*	-	*	-	-	*	*	-	*	-	*	-	-
Prismatothecum .	*	-	-	*	-	*	-	*	*	-	*	-	-
Kochii	*	-	*	-	-	*	*	-	-	*	-	-	*
Hybridum ...	*	-	*	-	-	*	*	-	-	*	-	-	*
Billardieri ..	-	*	-	*	*	-	*	-	-	*	*	-	-
Ammophilum ...	-	*	-	*	*	-	*	-	*	-	-	*	-
Fruticulosum ...	-	*	-	*	-	*	*	-	-	*	*	-	-
Howitti	-	*	-	*	-	*	*	-	*	-	*	-	-

* The length of the fruiting peduncle in relation to the petiole of the leaf.

Zygophyllum hybridum, *Tate*, 1899.

A diffuse annual. Leaflets obliquely oblong, entire ; petiole somewhat flattened, longer or twice as long as the blade.

Flowers yellow, relatively small, pentamerous, the petals not 6 mm. Stamens ten, the filaments shortly winged. Capsules on erect stalks exceeding the leaves, often violet-coloured; oblong, about 10 mms. long, with five blunt angles ; seeds from four to six in a cell, compressed, pyriform in peripheral outline, dark-brown; funiculus affixed at the upper one-third or to near middle of seed, thence decurrent to near the rounded end. The decurrent funiculus occupies a medial furrow, and is conspicuous therein as a white raised line. (This feature is also exhibited by *Kochii* and *iodocarpum).*

Mount Lyndhurst Run, Far North ; "grows on loose loamy soil, hence is seen at its best only in very wet seasons" (Mr. M. Koch) ; also Cootanoorina (Elder Exped. as *Z. glaucescens,* var.).

This new species has many characters in common with *Kochii;* but more particularly differs by its more oblong capsule, and the interspaces between the angles only shallow-concave, so that the angles appear blunt, though actually sharp-edged. It may be confounded with *iodocarpum,* which has, however, a globulose fruit on very short pendulous peduncles.

Zygophyllum Kochii, *Tate*, 1899.

A diffuse annual. Leaflets oblong-cuneate, a little longer than the somewhat flattened petiole, irregularly two- or three-crenate (as in *Z. crenatum).* Flowers yellow, relatively small, pentamerous, the petals not 8 mm. long. Stamens ten, the filaments shortly and broadly winged. Capsules on pendulous stalks longer than the petioles, but not exceeding the leaves ; quadrately-oblong to oval-oblong in outline, about 10 mm. diameter, acutely five-angled, a deep acute sinus between the angles, but not winged. Seeds usually four in each cell.

Near Mount Fitton and Trinity Well (Mr. J. Langley).

This species resembles *Z. crenatum* in several particulars, but differs markedly by its pentamerous flowers and deep acute sinus between the angles of the capsule.

Eriocaulon submersum, *Tate*, 1899.

Dwarfish, stem undivided ; leaves all radical, densely tufted, lanceolate acute-pointed, varying from 20 to 50 mm. long ; average examples about six times as long as wide, erect ; the cells of the leaves very conspicuous.

Flower-heads ovoid, rarely attaining to more than 5 mm. wide and 4 mm. long, on a scape slightly exceeding the leaves.

Bracts orbicular-oval, concave, relatively large, about 2 mm. long, yellow and shining.

Female flowers: sepals two, white, concave, and somewhat keeled, glabrous, free, equal; petals four, linear-spathulate, the fourth smaller than the others, cohering at the base; style one, with two filiform branches; fruit globulose, minute, pale-brown, and shining.

The species is anomalous in its tetramerous flowers; whilst its glabrous flower-heads and the form of its floral leaves distinguish it, otherwise, from all Australian species.

This is the first record of a member of the Order Eriocauleæ in South Australia, though an undescribed species occurs in the Macdonnell Ranges in the extra-tropical part of the Northern Territory.

The collector, Mr. Max Koch, supplies the following information as to its habitat, &c.:—"About ten miles north from Trinity Well, on the main road to Innamincka, there is a large plain. Here and there are elevations of several feet high, densely covered with sedges: these elevations are the springs. Although they have never been known to go dry, yet not a large quantity of water seems to run away, and there is sufficient to water from one to several thousand sheep. It is in these springs that the *Eriocaulon* grows densely packed together, so that you may stand on them; for beneath them is nothing but a deep bog. The water is glittering between the leaves; the top portion of them and the flower-heads are out of the water. The leaves are succulent, but rigid; the part exposed to the light is of a pale-green colour, the lower part of the leaves is white."

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

FOR 1898-9.

ORDINARY MEETING, NOVEMBER 1, 1898.

W. L. CLELAND, M.B. (President) in the chair.

BALLOT.—A. Purdie, M.B., Saml. Hughes, B.Sc., and Max Koch were elected Fellows.

EXHIBITS.—A. ZIETZ, Assistant Director Museum, exhibited eleven species of Australian wrens *(Maluridæ)* from Museum. J. G. O. TEPPER exhibited mineral specimens from Coolgardie and galls from Acacia. Prof. TATE two plant specimens from Mount Lyndhurst, collected by Mr. Koch, *Acacia papyrocarpa* and *Cochorus longipes*. W. HOWCHIN a specimen of Eocene limestone from a brick-pit at Southwark, showing casts of Turritellæ and other shells. This stone evidently occupied site of old river bed, and had lost by leaching most of its calcareous constituents. A section of the pit gives 20 ft. of brick-earth from the surface, 9 ft. loose river sand and coarse gravel below that, then 16 ft. of tenaceous red clay. At 45 ft. water was tapped. He considered that the occurrence of the old river bed in this unexpected position indicates a change in the line of drainage, and is concommitant with the oscillations of level that have occurred along the seaboard in recent geological time.

ORDINARY MEETING, DECEMBER 6, 1898.

W. L. CLELAND, M.B. (President) in chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., exhibited specimens of the bee-flies and their rat-tailed pupa cases (*Enstalis, sp.*) with queen and worker bees. Also galls from *Acacia retinoides* produced by gall midges (*Diplosis*) a number of which were shown, together with parasites bred with them; minute Chalcidid wasps, the minute beetle of the family Carylophidæ and larvæ, and an Anthrinus beetle, the larvæ of which must have lived in the interstices of the galls.

PAPERS.—"Nesting Habits of the Australian Rails with Specimens of Eggs," by A. M. MORGAN, M.B. "New Species of S.A. Chitons," by W. G. TORR, LL.D., and E. ASHBY. "Further Descriptions of S.A. Coleoptera," by Rev. THOS. BLACKBURN, M.A.

ORDINARY MEETING, MAY 2, 1899.

W. L. CLELAND, M.B. (President) in chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., exhibited specimens of what is known as "pug and cement" from Kanowna, W.A., both containing gold in a fine flaky form very difficult to extract, and which yielded to the "Haycraft" process. Also a very beautiful picture of butterflies, printed in colours true to nature from photographic plates in three colours.

Proposed by Mr. DIXON, seconded by Mr. TEPPER—"That the President, Vice-President, and as many of the Fellows as could attend, represent this Society on a deputation which will shortly wait upon the Government to urge upon it to conserve and add to the forest reserves." Carried.

Mr. TEPPER, referring to the death of the late Mr. E. Guest, at Yahl, called attention to the valuable collection of moths he had left.

Proposed by Mr. DIXON, seconded by Mr. HOWCHIN—"That the above announcement was received with regret. It was further proposed that the Board of Governors of the Museum have their attention called to the valuable collection of Microlepidoptera he had made, with a view of securing the same for the Museum." Carried.

PAPERS.—"An Explanation of Diamagnetism," by RD. KLUMAN. "Notes and Remarks, with List of Dragon-flies of South Australia and Polynesia," by J. G. O. TEPPER. F.G.S., and M. René MARTIN.

ORDINARY MEETING, JUNE 6, 1899.

W. L. CLELAND, M.B. (President) in chair.

EXHIBITS.—A. ZIETZ, F.L.S., C.M.Z.S., exhibited the Museum collection of Psittacidæ. J. G. O. TEPPER, F.L.S., specimens of native silver in fine capillary form, black garnets, and the resin of the courie usually called gum-dammar, with a piece of amber to show the striking resemblance, even to the entombed insect found in each.

Prof. TATE, F.G.S., reported that the Board of Governors of the Museum required more information *re* the late Mr. Guest's collection.

Mr. Tepper handed in list of Lepidoptera from Los Angelos, California, for exchanges.

Prof. TATE called attention to *Drosera Whittakerii*, known for the last 40 years by the name of "painter," in allusion to its dye properties.

BALLOT.—T. L. BROWN, Barrister; ANDREW FERGUSSON, Agricultural School, Adelaide; and R. KLUMAN, as Fellows.

PAPERS.—"Older Tertiary Fossils of uncertain age from the Murray Desert," by Prof. TATE, F.G.S. "Description of New Species of Australian Tertiary Corals," Part I., by J. DENNANT, F.G.S.

ORDINARY MEETING, JULY 4, 1899.

W. L. CLELAND, M.B. (President), in the chair.

EXHIBIT.—Dr. STIRLING brought under the notice of the Society a French work on natural history, with description and plate of Emu formerly found on Kangaroo Island, but now extinct, mentioned by M. Peron, naturalist in Baudin's voyage of discovery. Mr. ZEITZ mentioned that he had heard from a resident that the last of the species had been shot some six years ago.

PAPERS.—"On the Manus and Pes of Diprotodon," by Prof. STIRLING, M.D., and A. ZIETZ, Assistant Director of the Museum, and "On the Identity of Phascolomys (*Phascolonus gigas*)," with "Sceparnodon Ramsayi" by the same.

ORDINARY MEETING, AUGUST 1, 1899.

W. L. CLELAND, M.B. (President), in the chair.

EXHIBITS.—Mr. T. S. REID showed some beautiful leaf impressions, and stated that the leaves were first subject to heavy pressure to level down angular portions, then a piece of plate glass covered with printer's ink was laid upon them. The leaves thus covered with ink were ready to be impressed on the paper.

Mr. TEPPER exhibited a case of beetles recently added to the Museum.

PAPER.—"Notes on the geology of Kangaroo Island, with special reference to the evidence of extinct Glacial Action," by W. HOWCHIN, F.G.S.

ORDINARY MEETING, SEPTEMBER 5, 1899.

W. L. CLELAND, M.B. (President), in the chair.

EXHIBITS.—A. ZIETZ, F.L.S., exhibited a substance resembling Coorongite, which under the microscope proved to be the skin of some cetaceous mammal. Prof. TATE remarked that Coorongite had been carefully examined in London, and there shown to be of vegetable origin. Mr. HOWCHIN stated that Coorongite was found at the top of flood line, where occasionally inundation takes place, and suggested a possible connection with the carbon-

aceous mud found in certain wells and springs in S.E. J. G. O. Tepper, F.L.S., exhibited a specimen of *Chiastolite*, a silicate of alumina, from Murchison district, W.A., showing the dark cross from which it is named.

Papers.—"Description of Australian Curculionidæ," Part I., by Arthur M. Lee, Tasmanian Government Entomologist, introduced by Rev. Thos. Blackburn, B.A. "On the Worturpa Telluride," by A. J. Higgin. "Revision of the Australian Liotredæ and Cyclostiimatidæ," "Miscellaneous contributions to the Molluscan Fauna of Australia," "Revision of the Mollusca of the Older Tertiaries of Australia," by Prof. Tate, F.G.S. "Fossil Repitilia of the Lake Eyre Basin," by A. Zietz, F.L.S.

Annual Meeting, October 3, 1899.

W. L. Cleland, M.B. (President), in the chair.

Exhibits.—Prof. Tate, F.G.S., showed botanical specimens collected by Mr. Max Koch, *Eriocaulon submersum*, from Public House Springs, Lake Eyre Basin, and *Minuriella amnua*, *Zygophyllum hybridum*, and *Z. Kochii*, from Mt. Lyndhurst run. Mr. E. Ashby, several species of Caladenia. Mr. Howchin the true Coorongite.

Annual Report and Balance-sheet read and adopted.

Election of Council.—President, W. L. Cleland, M.B.; Vice-Presidents, Prof. Ralph Tate, F.G.S., and Walter Howchin, F.G.S.; Hon. Treasurer, Walter Rutt, C.E.; Auditor, Edwin Ashby; Members of Council, Prof. Rennie, D.Sc., Prof. Stirling, M.D.; Rev. Thos. Blackburn, B.A., S. Dixon, J. S. Lloyd, and W. H. Selway.

Presidental Address read by the President, and upon the motion of Prof. Tate, seconded by Walter Howchin, was ordered to be printed in the Society's Transactions.

Papers.—"Definitions of four new species of Flowering Plants inhabiting South Australia," by Prof. Ralph Tate, F.G.S. "New Tertiary Corals," Part II,, by Jas. Dennant, F.G.S. "Notes on a description of the male of *Coelostoma immane* (Maskell), and a new species of a Leaf Mining Moth," by J. G. O. Tepper, F.L.S.

Ballot.—A. J. Higgin as a Fellow.

ANNUAL REPORT.

The Council has to report that during the past year the work of the Society has included research in the various departments of science as represented by the various papers read before the Society and included in its Transactions.

The membership of the Society consists of 10 Hon. Fellows, 68 Fellows, 7 Corresponding Members, and 1 Associate. Six Fellows have been elected during the year.

It had been decided by the Council to publish a series of "Memoirs" of the Royal Society in royal-quarto size for the purpose of presenting the descriptions of the Fossil Remains of Lake Callabonna in this province in a more suitable form than is permitted by the size of the "Transactions." The first part of the first volume of the "Memoirs" has now been issued. Other parts will appear as circumstances permit.

The Council gratefully acknowledge the timely assistance of the Government of this colony, exercised through its Treasurer (the Hon. F. W. Holder), in making a special grant of money which has removed the principal obstacle to publishing a scientific account of the Callabonna discovery.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£	s.	d.	£	s.	d.
To Balance, October 1st, 1898				162	19	0
" Subscriptions—						
Royal Society	69	11	0			
Field Naturalists' Section	17	0	0			
Astronomical Section	10	0	0			
Malacological Section	1	2	4			
				97	13	4
" Government Grants—						
Ordinary	58	2	3			
Illustrating Fossil Fauna of South Australia	100	0	0			
				158	2	3
" Sale of Transactions				0	5	0
" Reimbursement by School of Mines towards Cost of Three Plates ...				1	7	6
" Interest				5	5	4
				£425	12	5

Cr.	£	s.	d.	£	s.	d.
By Cost of Transactions—						
Printing	122	10	10			
Illustrating	27	16	8			
Publishing	10	3	9			
				160	11	3
" Cost of Memoirs—						
Printing	38	7	6			
Illustrating	58	8	0			
Publishing	2	17	6			
				99	13	0
" Wages—Caretaker				3	0	0
" Printing, Postage, Stationery, &c. ...				9	6	0
" Library—Fittings				0	14	8
" Grants-in-aid—						
Field Naturalists' Section	20	0	0			
Astronomical Section	27	0	0			
				47	0	0
" Exchanges on Cheques				0	1	6
" Balance in Savings Bank, Oct. 1st, 1899				105	6	0
				£425	12	5

Audited and found correct,
EDWIN ASHBY, Auditor.
28th September, 1899.

WALTER RUTT, Treasurer.

PRESIDENT'S ADDRESS.

Following precedent, the President addresses a few remarks to the Fellows at the Annual Meeting. The work of the past year has already been stated to you in the Report of the Council, and it is only necessary for me to congratulate the Society on the publication of a portion of the work in connection with the Callabonna fossils in quarto form as Memoirs. This has been necessary owing to the large size of the illustrations. Again the Society has to thank the Government for its enlightened generosity in placing a further sum of £100 on the Estimates of the current financial year for this purpose. It is to be hoped that at some future time a former contribution of the Callabonna fossils, namely, the description of the bones of *Genyornis Newtoni*, may also be re-issued in the enlarged form, so as to allow of the whole of the Callabonna work being published on a uniform scale. Fortunately the negatives of the plates have been preserved, so that the expense would be trifling. It will, however, be a matter for regret that the idea of a joint descriptive anthropological work on the Australian aborigines has not advanced beyond the stage of being referred to the meeting of the Australasian Association for the Advancement of Science, to be held in Melbourne next January. There are, no doubt, many difficulties of an organising nature that await solution, but it is to be hoped that the man and the hour will mutually rise equal to the occasion. But if the outlook is not so favourable as might be desired in this matter, there is still ample room for congratulation on the part of Australian Anthropologists, that in closely successive years two works on the Australian Aborigines of supreme importance have made their appearance. Reference is made to "Ethnological Studies among the North-West Central Queensland Aborigines," by Dr. Roth; and to "Native Tribes of Central Australia," by Prof. Baldwin Spencer and Mr. F. J. Gillen, Special Magistrate. All will agree that these works, although of immense value, do not reach finality; but as Pouchet says, in the preface to his work on "The Plurality of Races," "Books are, after all, merely a summary; they are behind-hand even on the day they are published." The learned authors, however, have literally put into practice the advice given by Flourens:—"We can only arrive at the distinction of species by direct and complete personal observation." And as Pouchet, who quotes him, goes on to say:—"The surest method of arriving at conclusive

evidence in anthropology is necessarily travels. Doubtless the study alone of the materials collected from afar is of the greatest possible use. But we repeat, concerning the study of mankind, what we said about the study of animals; the anthropologist must leave his library and go into the great continents, in order to study by means of his own eye-sight. That it must be complete we have endeavoured to show; but the only condition for its being complete is its being direct. . . . We can study philology and craniology in the library and in solitude, assisted by proper documents and sufficient materials—but not anthropology. . . . We must not seek for a pure population in the streets of large cities. We can only study, in these places, individuals, not species. In those parts alone which we must make centres of observation, can we see man indefinitely multiplied among really primitive people still free from inter-mixture, or with the least possible taint of the same. Then we must hasten to seize his general characteristics, and take both his physical and moral portraits."

In the last Presidential Address the opinion was quoted that the Australian aborigines were not an example of a degenerate race. Prof. Baldwin Spencer and Mr. Gillen endorse this opinion in their introduction, and no other observers can write with more authority or express an opinion carrying more weight. They say: "It is sometimes asserted that the Australian native is degenerate, but it is difficult to see on what grounds this conclusion is based. His customs and organization, as well as his various weapons and implements, show, as far as we can see, no indication of any such feature. . . And there is at all events no evidence of the former existence of any stage of civilization higher than the one in which we now find them." Andrew Lang, referring to the Australians, writes:—"The natives are a race without a history, far more antique than Egypt, nearer the beginning than any other people. . . The soil holds no pottery, the cave walls no pictures drawn by men more advanced; the sea hides no ruined palaces, no cities are buried in the plains; there is not a trace of inscriptions nor of agriculture. The burying places contain relics of men perhaps even lower than the existing tribes, nothing attests the presence in any age of men more cultivated." Apparently the Australian natives represent one of those primitive types of mankind that were evolved at an early period after the parting of the two great branches of the tree of biology pertaining to the simian and human developments. And the analogy of tree growth may be carried further in the tendency which the larger branches have of producing buds, which may become developed into shoots and twigs of various lengths and strengths. The growth of these off-shoots would depend upon

circumstances, and we may infer that in these primitive types of mankind, the initial force which caused them to bud forth was feeble and the environment uncongenial to the evolution of a higher type. The first of these causes was probably the more effective, as at that period there was not as great a contrast between them and the corresponding developments on the simian branch, as exists at the present day between lowest man and highest ape. So that these early types never became evolved to a more imposing size and importance than that of abortive shoots on the human branch, and never were intended for anything more than local effects of a transitory nature, and were never destined to play any important role in the general evolution of mankind. This supposed initial uselessness does not, however, detract from their interest as anthropological studies. Their want in evolutionary force makes it probable that they still represent a type not far removed from the general anthropological development characteristic of the primeval times, when they first diverged from the general line.

It must always be a matter of considerable difficulty to decide whether the savages inhabiting any particular locality are autochthonous or not. There appear to be a few spots on the surface of the globe whose inhabitants seem to merit this claim. At first sight it seems incredible that a country like India, that has been under the influences of civilizations from the remotest recorded times, should still harbour some of these primitive races. It is known that in the upper basin of the Nerbudda, in the centre of Hindostan, a forest race exists who are called by the ordinary inhabitants "monkey people." They are described as being short, flat-nosed, with pouch-like wrinkles in semi-circles round the corners of the mouth, the arms disproportionately long, and the body of a rusty black colour covered with a reddish hair. Again, it is recorded by Crawford in a paper to the British Association for the Advancement of Science, in 1852, that three naturalists travelling on the northern coast of New Guinea, for scientific purposes, found the trees full of natives, who leaped from branch to branch like monkeys, with their weapons fastened on their backs. Pouchet says:—"This singular race has been noticed in Hindostan by many eye witnesses, and seems to live half its time in trees. We have a right to ask if the confused remembrance of such a race and such habits was not the origin of the tradition which served as a foundation for the poem of Valmiki. Rama goes to the rescue of his wife, Sita, who had been carried off by the evil genius, Râvana; he is assisted in this enterprise by a valiant army of monkeys." In a foot-note the Editor of the "Plurality of Races," Mr. Beavan, barrister-at-law, refers to "Voyages de Francois Pyrard," published in 1615;

there it is stated that at Sierra Leone there is a species of animal so strong-limbed and industrious that when properly trained and fed, will work like servants. Also to the "Voyages de Guatier Shoutten aux Indes Orientales" where nearly the same account is given of what was considered to be the orang. They are taken with snares, taught to walk on their hind feet, and to use their fore feet as hands in performing different operations, as rinsing glasses, carrying drink round to the company, turning a spit, &c. To these early travellers it probably did not occur that man could exist in such primitive types, hence they were looked upon as a kind of ape. In more modern times the orang-utan, or men of the woods, of the Malay Peninsula, have been described, and if they are autochthones they probably represent a primordial type of the Mongolian centre, judging from their portraits. In such a case they could hardly have any anthropological associations with the aborigines of Australia. There are, however, some habits which show a strange similarity in the two races. One is the manner of obtaining fire by rapidly rotating two dry pieces of wood together. Another is a mode of burial in which a lateral chamber is made at the bottom of the grave into which the corpse is laid, so that the superincumbent earth, when the grave is filled in, may not incommode the dead and make it irritable. This lessens the chances of the spirit subsequently wanting to injure the relatives or removing itself too quickly to the camp where its mother was born. A supply of food is left for the same purpose. This method of burial is described by the Rev. L. Schultz, late Moravian Missionary at the Finke River, vide Transactions of Roy. Soc. S.A., vol. XIV., part 2; but, as far as I can see, neither by Dr. Roth nor Prof. Baldwin Spencer and Mr. Gillen. A third example relates to a common practice of the orang-utan and a tradition of the Australian aborigines. The orang-utan are inveterate smokers, and if for any reason they have to desist, the partly consumed rolled tobacco-leaf is stuck in a hole in the lobule of the ear ready for future use. The tradition, as given in the "Native Tribes of Central Australia," relates to what are called the Alcheringa ancestors, and the particular incident is mentioned in connection with a tragedy enacted during some circumcision ceremonies. An old man was the offender, and he is decribed "as drawing a stone knife from a socket in his skull just behind the ear." Making allowance for the age of the tradition it may be surmised that at that time or subsequently it was a practice to carry small articles of value in perforations of the lobule of the ear similiar to the orang-utan plan.

A characteristic of these primordial types appears to be their tendency to identify themselves with the rest of the natural objects of their particular locality. This may be a survival of a

sentiment of brotherhood to all branches of the biological tree from the time when the idea of the common origin of everything did not appear as incongruous as it might do to the unphilosophic minds of the present age. At that period there would be no conception of a necessary specific difference between the animate and the inanimate. The native idea of the creation of man, according to the "Native Tribes of Central Australia," was that two beings who sat up in the western sky saw, scattered all over the country, various shapeless masses. This offended their sense of good taste; therefore they descended to earth with their stone knives and set to work. A split on each side made the arms, a division at one end made the legs, a transverse gash at the other end sufficed for a mouth, two smaller ones for eyes, poking two fingers into the space between made the nostrils, and, curiously, the final step in this rough surgery was the circumcising of the new made-individual. He became now one of the Alcheringa ancestors, with power to continue the work, a supply of stone knives being left with him for the purpose. As Andrew Lang writes, they deemed themselves akin to all Nature, and called cousins with rain and smoke, with clouds and sky, as well as with beasts and birds. We have only to look at any of the old mythologies to see what a strong tendency there has always been to people any natural object with spiritual beings who had the power of communicating with or otherwise influencing the ordinary human inhabitants. It was only a step from this to the belief in metempsychosis, which appears to have existed in the earliest dawn of the human race, and to have been perpetuated to historical times. The idea in the mind of the native woman as to how conception occurs, and described in the "Native Tribes of Central Australia," is a pure metempsychosis, and is the origin of the system of totems. Scattered all over the country are the spots where the Alcheringa ancestors entered again into the earth. These spots are generally marked by some natural object in which the spirit resides. If a woman happens to be near one of these spots when she first becomes aware of being pregnant she has not the slightest doubt but that the spirit has jumped into her, and will in the process of time be reincarnated in the form of her child, who must then assume the totem characteristic of that particular spirit.

Deep down in the basis of our mental constitution there must still lurk, and, perhaps not erroneously, a strong feeling of kinship to Nature, for if it were not for this, such books as Æsop's Fables would never have attained their celebrity nor have maintained their hold on so many successive generations of mankind; nor would Kipling's Jungle Book have proved so realistic to modern readers. And we find that the Australian natives are no excep-

tion to this most fundamental characteristic of the human race. A study of the chapters on the origin of the Totem and the Traditions as to Alcheringa ancestors of the "Native Tribes of Central Australia," yields ample and confirmatory evidence of a most interesting nature. And a perusal of "Australian Legendary Tales," collected and translated by Mrs. Langloh Parker, of Bangate, Narran River, N.S.W., leaves the impression that they are Æsop's Fables in an Australian dress. The tales consist of the folk-lore of the Noongahburrah tribe, among whom the authoress lived. The interest attaching to this particular record of legendary lore is largely due to its coming direct from the primitive people, who have handed it down from the remotest antiquity. Another point of interest is the great similarity that exists as regards the essential idea contained in the records of the two works just mentioned, seeing that they relate to distantly separated parts of Australia. Mr. Andrew Lang, in his introduction to "Australian Legendary Tales," writes:—"They are a savage edition of the Metamorphoses, the latter being a very late and very artificial version of traditional tales as savage in origin as those of the Noongaburrah. . . . Man, bird, and beast are all blended in the Australian fancy, as in that of Bushmen and Red Indians. All are of one kindred, all shade into each other, all obey the Bush Law as they obey the Jungle Law in Mr. Kipling's fascinating stories. . . . This is a prevalent feature of our own popular tales. But the Australians do it more natural; the stories are not the heritage of a traditional and dead, but the flowers of a living and actual condition of the mind."

Another feature of these primordial types appears to be what is called their non-plasticity. It is evident that if any race is to be progressive, it must have a capacity for adapting itself to any changes of the environment, and also to being able to form fertile hybrids with any other invading races. The more primitive the type and the more pure bred the race, the less is the power of adaptation. From a national point of view pure breeds are anything but desirable, and it is only those raceless masses—of which the British are an excellent example—the survivors and products of past anthropological baptisms, that ever rise to world-wide renown and influence. As Vogt, writes in his "Lectures on Man":—"The further back we go in history the greater is the contrast between individual types, the more opposed are the characters—the most decided long-heads immediately by the side of the most decided short-heads. Our savage ancestors stand opposed to each other; stock against stock, race against race, species against species. By the constant working of his brain man gradually emerges from his primitive barbarism; he begin

to recognise his relations to other races, with whom he finally interbreeds. The innumerable mongrel races gradually fill up the spaces between originally so distinct types, and notwithstanding the constancy of character, in spite of the tenacity with which the primitive races resist alteration, they are by fusion slowly led towards unity." Or he might have added, improved off the face of the earth. So that everywhere we find that when a primordial type of man is brought in contact with more vitalised or plastic types it speedily appears to melt away and become extinct. The more primitive and purer the type the less is its chance of becoming modified by crossing with other types. This may be explained as due to the premature budding away or divergence from the parent anthropological branch prior to a more perfect general evolution.. In other words they were less humanised at the time of their separate evolutionary parting.

The aborigines of Australia are no exception to this rule, and it is simply due to their long protection by isolation that they still exist. For the same reason we see them accompanied still by birds and beasts—the kangaroo, the platypus, the emu—"ancient types," as Andrew Lang says, "rough grotesques of Nature, sketching as a child draws." But for this protection they would now have only been known as we know the smaller marsupials in England within the Oolitic period, and the remains of the autochthones of Europe that preceded and were driven before other invading races. As Nicholson, in his "Manual of Zoology," writes :—"In England, at the time of the deposition of the Stonefield slate, there must have been a fauna and flora very closely resembling what is now seen in Australia. The small marsupials prove that the mammals were the same in order; cones of Araucarian pines, with tree ferns, &c., occur throughout the Oolitic series ; spine bearing fishes like the Port Jackson shark are abundantly represented by genera ; and lastly the genus *trigonia*, now exclusively Australian, is represented by species which differ little from those now existing." But whilst a general isolation from other human races has served as a protection, the various local isolations brought about by the physical features of the continent do not seem to have had much effect in producing different sub-types amongst the Australians themselves. The Australian type of face appears remarkably uniform, and it is difficult from an inspection of photographs to decide whether the individual is from the Northern Territory and Gulf of Carpentaria or from the McDonnell Ranges, or from the South coast. As a rule, in other divisions of the animal kingdom, the fact of isolation tends to the development of characteristics which become distinctive and specific. Take such genera as the land mollusca as an example. Schmidt in his "Doctrine of Descent and

Darwinism," refers to the pulmo-gasteropoda of Madeira. He says :—" It is seen that in isolated islands and island groups these earth-bound animals, migrating with so much difficulty have attained an extraordinary diversity. In the Madeira Islands, 134 species of pulmo-gasteropoda were reckoned to exist, of which only 21 were to be found in the Africo-European fauna. These and the 113 other species are mostly confined to narrow districts and single valleys. . . . We must infer that a connection at one time existed between Europe and Madeira, and that these 21 species remained what they were before the separation, while from unknown species still appearing in analogous forms upon the continent emanated the remarkable profusion of new species. They and their comrades on other isolated islands were spared a conflict many sided, and they doubtless afford a favourable example of Wagner's law of migration, as with the difficulties of locomotion and the improbability of a large subsequent arrival, the secluded individuals under even slightly different influences, had had a prospect of diverging from the parent species." The Rev. Mr. Gulick in writing on the Hawaian Land Snails, as the result of 15 years study, also refers to the effects of isolation in producing a very large number of species. For this production of diversity we must assume in the respective genera a large amount of plasticity or power of accommodation to environment, and to a comparatively late appearance in biological evolution. If such an old mollusc as *trigonia* is taken we find a wonderful absence of plasticity, and a marked contrast to what has been said of certain island pulmo-gasteropoda, for it is solely now found living in Australian waters, being represented by six species only, vide W. T. Bednall, vol. I., Trans. Roy. Soc., S.A. The same writer says this " genus was excessively rich in representatives from its advent at the beginning to the close of the Secondary Age in Europe, when it died out altogether ; whereas in Australia it has survived throughout the whole period of Secondary and Tertiary times until the present day, though it must be admitted in a very limited degree in regard to number." It has already been referred to as forming one of the Australia-like features of the Stonefield Slate. We see, therefore, on the one hand certain molluscs diverging into numerous species ; and on the other hand a mollusc restricted to six species only and to one continent. Applying this to the Australian aboriginal, we infer that he does not possess plasticity, and has only been handed down from a most remote antiquity by propitious and protective isolation.

The conclusion then is that the Australian is not degenerate but primordial, and that this is shown by his still absolutely identifying himself with other natural objects around him ; and

also by his non-plasticity, which is shown by the fixity of the physical features of the race as a whole, and absence of characteristic divergences in distantly separated groups. A consequence of this is, that no longer protected by isolation, he must shortly entirely disappear from the face of the earth, for he is an anachronism and archaic. And if anything further is to be done to obtain records of this interesting primitive race it must be done quickly. Therefore those of the Fellows of this Society who will be able to be present at the Science Meetings in Melbourne, during January, 1900, should do their utmost to help formulate and actively set going some workable scheme for making an exhaustive study of the Autochthones of Australia.

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LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1899.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any changes in the addresses should be notified to the Secretary.

Date of Election

HONORARY FELLOWS.

1857. BARKELEY, SIR HENRY, K.C.M.G., K.C.B., F.R.S., Royal Colonial Institute, London.
1893. COSSMANN, M., Rue de Maubeuge, 95, Paris.
1888. *DENNANT, JOHN, F.G.S., F.C.S., Inspector of Schools, Russell-street, Camberwell, Melbourne, Victoria.
1876. ELLERY, R. L. J., F.R.S., F.R.A.S., Government Astronomer Victoria, The Observatory, Melbourne, Victoria.
1890. *ETHERIDGE, ROBERT, Director of the Australian Museum of New South Wales, Sydney.
1853. GARRAN, A., LL.D., Sydney, New South Wales.
1893. GREGORIO, MARQUIS DE, Palermo, Sicily.
1855. HULL, H. M., Hobart, Tasmania.
1855. LITTLE, E.
1892. *MAIDEN, J. H., F.L.S., F.C.S., Director Botanic Gardens, Sydney, New South Wales.
1899. MEYRICK, E. T., B.A., Ramsbury, Hungerford, Wiltshire, England.
1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Government Astronomer New South Wales, Sydney, New South Wales.
1894. *WILSON, J. T., M.D., Professor of Anatomy, Sydney University.

CORRESPONDING MEMBERS.

1881. BAILEY, F. M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1881. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, South Australia.
1880. *FOELSCHE, PAUL, Inspector of Police, Palmerston, Northern Territory, Australia.
1881. GOLDSTEIN, J. R. Y., Melbourne, Victoria.
1880. *KEMPE, REV. J., Australia.
1888. *MASKELL, W. M., Wellington, New Zealand.
1893. *MCKILLOP, REV. DAVID, S.J., Superior Daly River Mission, Northern Territory.
1886. NICOLAY, Rev. C. G., Freemantle, Western Australia.
1880. *RICHARDS, MRS. A., Mount Barker, South Australia.
1892. *SCHULZ, REV. LOUIS.
1883. *STIRLING, JAMES, Assistant Geological Surveyor, Victoria.
1893. *STRETTON, W. G., Palmerston, Northern Territory.

FELLOWS.

1887. Adcock, D. J., Adelaide, South Australia.
1874. Angas, J. H., Adelaide, South Australia.
1895. *Ashby, Edwin, Adelaide, South Australia.
1887. Bagot, John, Adelaide, South Australia.
1893. *Bednall, W. T., Adelaide, South Australia.
1887. *Blackburn, Rev. Thomas, B.A., Woodville, South Australia.
1884. Boettger, Otto, Adelaide, South Australia.
1886. *Bragg, W. H., M.A., Professor of Mathematics, University of Adelaide, South Australia.
1882. Brown, L. G., Adelaide, South Australia.
1883. *Brown, H. Y. L., F.G S., Government Geologist South Australia, Adelaide.
1899. Browne, T. L., Adelaide.
1898. Browne, J. H , North Adelaide.
1893. Brummitt, Robert, M.R.C.S., England, Kooringa, South Australia.
1879. *Cleland, W. L., M.B., Ch.M., J.P., Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer on Materia Medica University of Adelaide, Parkside, South Australia.
1895. Cleland, John B., Parkside South Australia.
1876. (L) Cooke, E., Commissioner of Audit South Australia, Adelaide. South Australia.
1895. Cooke, John H., Adelaide, South Australia.
1880. Cox, W. C., Semaphore, South Australia.
1887. *Dixon, Samuel, Adelaide, South Australia.
1876. Dobbie, A. W., Adelaide South Australia.
1896. Drummond, J. H. G., M.D., Moonta.
1893. Dudley, U.
1890. *East, J. J., F.G.S. (Corresponding Member, 1884).
1871. Elder, Sir Thomas, G.C.M.G., Adelaide, South Australia.
1899. Fergusson, Andrew, Agricultural School, Adelaide.
1886. Fleming, David, Adelaide, South Australia.
1882. Fowler, William, Melton, Yorke's Peninsula, South Australia.
1889. Fraser, J. C., Adelaide, South Australia.
1880. *Goyder, George, Jun., F.C.S., Government Analyst South Australia, South Australia.
1887. Grasby, W. C., F.L.S., Adelaide South Australia.
1896. Greenway, Thomas J., East Adelaide.
1890. Grey, Rev. William, Mount Barker, South Australia.
1896. Hawker, E. W., Adelaide.
1899. *Higgin, A. J., University, Adelaide.
1891. *Holtze, Maurice, F.L.S., Director Botainc Gardens, Adelaide (Corresponding Member, 1882), Adelaide, South Australia.
1883. *Howchin, Walter, F.G.S., Goodwood East, South Australia.
1899. Hughes, Samuel, B.Sc., Registrar of the School of Mines, Adelaide.
1893. James, Thomas, M.R.C.S., England, Moonta, South Australia.
1896. Jones, J. W., Conservator of Water, Adelaide.
1853. (F) Kay, Robert, General Director and Secretary South Aurtralian Public Library, Museum, &c., Adelaide, South Australia.
1894. Kershaw, James A., Entomologist National Museum, Melbourne.
1899. Kleeman, Richard, Rowlands Flat.
1899. *Koch, Max, Mt. Lyndhurst.
1884. Lendon, A. A., M.D., M.R.C.S., Lecturer on Forensic Medicine and on Chemical Medicine University of Adelaide, Honorary Physician Children's Hospital, North Adelaide, Adelaide, South Australia.

1866. Lloyd, J. S., Adelaide, South Australia.
1888. *Lower, O. B., F. Ent. S., Broken Hill.
1885. *Lucas, R. B., Adelaide, South Australia.
1896. Lukowitz, M. von, M.D., Adelaide.
1874. *Magarey, S. J., M.D., M.L.C., Adelaide, South Australia.
1874. Mayo, G. G., C.E., Adelaide, South Australia.
1888. Molineux, A., F.L.S., Secretary Central Agricultural Bureau, South Australia, Kent Town, South Australia.
1884. Munton, H. S., Brighton, South Australia.
1859. (L)Murray, David, Adelaide, South Australia.
1896. *Parker, Thomas, C. E., Rockhampton, Queensland.
1893. Perks, R. H., M.D., F.R.C.S., England, Birksgate, South Australia.
1883. Phillips, W. H., Adelaide, South Australia.
1886. Poole, W. B., Adelaide, South Australia.
1899. Purdie, A., M.A., School of Mines, Adelaide.
1885. *Rennie, H. E., M.A., D.Sc., F.C.S., Professor of Chemistry University of Adelaide.
1876. *Rutt, Walter, C.E., Adelaide, South Australia.
1891. Selway, W. H., Adelaide, South Australia.
1893. Simson, Augustus, Hobart, Tasmania.
1857. Smeaton, Thomas D., Blakiston, Littlehampton, South Australia.
1871. Smith, Robert Barr, Adelaide, South Australia.
1881. *Stirling, Edward C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Lecturer on Physiology University of Adelaide, Honorary Director South Australian Museum, Adelaide, South Australia.
1876. *Tate, Ralph, F.L.S., F.G.S., Professor of Natural Science University of Adelaide.
1886. *Tepper, J. G. O., F.L.S., Entomologist South Australian Museum (Corresponding Member, 1878), Adelaide, South Australia.
1899. *Torr, W. G., LL.D., Way College.
1894. *Turner, A. Jefferis, M.D., Brisbane.
1889. Vardon, Joseph, J.P., Adelaide, South Australia.
1878. *Verco, Joseph C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics and on Clinical Medicine University of Adelaide, Adelaide, South Australia.
1883. Wainwright, E. H., B.Sc., St. Peter's College, South Australia.
1878. Ware, W. L., Adelaide, South Australia.
1879. Way, Edward W., M.B., M.R.C.S., Lecturer on Obstetrics and Diseases Peculiar to Women and Children University of Adelaide, Adelaide, South Australia.
1859. Way, Rt. Hon. Sir Samuel J., Bart., D.C.L., Chief Justice and Lieutenant-Governor South Australia, Adelaide, South Australia.
1886. *Zietz, A., F.L.S., Assistant Director South Australian Museum, Adelaide, South Australia.

APPENDICES.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

SIXTEENTH ANNUAL REPORT OF THE COMMITTEE.

BEING FOR THE YEAR ENDING SEPTEMBER 30TH, 1899.

Evening Meetings.—Nine evening meetings have been held, at which papers, &c., have been given as under:—

1898.

Oct. 18—"The Birds of the Finniss District," Dr. A. M. Morgan.

Nov. 18—Conversazione: addresses by E. Ashby, W. Howchin, F.G.S., and J. G. O. Tepper, F.L.S.

1899.

April 18—Easter Encampment of Boys' Field Club at Port Willunga. E. Ashby.

May 18—"South Australian Orchids," J. G. O. Tepper, F.L.S.

June 20—"Natural History Recollections of New Zealand," Mrs. S. L. Schourup; "Remarks on Thelyphonus sp.," F. R. Zietz.

July 18—"Comparisons and Contrasts between the Levant and South Australia," W. C. Grasby, F.L.S.

Aug. 23—"A New Use for Spiders," W. H. Selway, Jun. Replies to questions (question-box), J. G. O. Tepper, F.L.S.

Sept. 12—"Australian Birds," A. J. Campbell.

" 26—Annual Meeting, Chairman's Address, E. Ashby.

The most noticeable feature of these indoor gatherings was the conversazione, which was the first held for four years, and which attracted a very large attendance. A new departure on that occasion was that of having short addresses at intervals during the

evening, the time between being taken up by an inspection of a large and interesting display of exhibits. This, together with music and refreshments, helped the visitors to spend a pleasant and instructive evening. Another large gathering was that on the occasion of the lecture of Mr. A. J. Campbell, of Melbourne, the well-known expert in ornithology, whose descriptive remarks on "Australian Birds," and photographs of their nests and eggs taken on the spot, and shown by the aid of limelight, were much appreciated. We were indebted to a former member, Mr. W. C. Grasby, F.L.S., for filling up one evening—the first on which the Boys' Field Club (of which that gentleman is President) met jointly with this Section. It will be noticed that Dr. A. M. Morgan gave a paper on "The Birds of the Finniss District," and it may here be mentioned that during the past year a few members specially interested in bird life formed themselves into a separate organization, known as "The Ornithological Association of S.A.," of which Dr. Morgan is the first President. It is to be hoped that this step will not be the means of the members of the Field Naturalists' Section losing the privilege of listening in future to papers on a subject so peculiarly appropriate to a Field Club as that of ornithology.

It will be seen that we had the pleasure of hearing one paper read by a lady member, and it is hoped that her example will be followed by others of her sex, which forms a considerable proportion of our membership.

Exhibits in several departments of Natural History have been shown at these meetings, and have added considerable interest to the proceedings. Opportunity is in this way given to show for the benefit of the members generally what has been found at the various excursions. The attendance at both evening meetings and excursions has been well maintained.

Excursions.—During the year twelve excursions have been held, of which the following is a list:—

1898.

Oct. 15—Blackwood.
29—Upper Sturt.
Nov. 14—Hack's Bridge, River Onkaparinga.
26—National Park, via Waverley.

1899.

Feb. 25—Dredging, Port River.
March 11—"Holmfirth," Fulham.
April 1—Mt. Lofty (Summit).
May 13—Botanic Gardens, Museum of Economic Botany.
June 24—Grange.
Aug. 19—Blackwood.
Sept. 1—Gawler.
23—Teatree Gully.

The longest of these excursions were those to Hack's Bridge and Gawler, both of which were revisited after a lapse of some years. That to Gawler introduced the members to many plants not seen nearer Adelaide. Although most of the names of the other localities are familiar, the excursions have been to different portions of those places or at other times of the year. One of the most pleasant was that to Upper Sturt, via National Park, and back by way of Crafers, when the members were indebted to the hospitality of Mr. and Mrs. J. H. Symon. The summit of Mt. Lofty was visited on April 1st, when Mr. and Mrs. W. B. Sells entertained the members. A visit to "Holmfirth," Fulham, by invitation of Mr. and Mrs. J. F. Mellor, gave a much enjoyed outing at a time of the year when it is difficult to find suitable localities for excursions. Blackwood was visited earlier in the season than usual, under the guidance of Mr. T. C. A. Magarey, to whom, as well as to Mrs. Magarey, the Section is under obligation. One dredging trip was arranged, and a visit to the Museum of Economic Botany was not the least profitable of the out-door meetings. The excursions have been the means of enriching the members' collections, but, as is to be expected, it seldom happens that any absolutely new discovery is made.

Fauna and Flora Protection Committee.—The report from this Committee shows that the questions of the preservation of our forests and a new Birds Protection Bill have been the most important subjects dealt with by it during the past year.

Boys' Field Club.—During the year the question of combining in some way with this club was brought forward, and a sub-committee from each Society drew up resolutions which met with acceptance, and now the junior club has the privilege of holding its meetings in the Royal Society's room, and of attending the meetings of this Section, while it is hoped that the latter will benefit by an acquisition to its membership of those who, to some extent, are thus being prepared for it.

Obituary.—We have lost the unusual number of four members by death during the year, three of them in the same month (March, 1899), viz., Miss Jessie L. Hussey, Mr. E. F. Turner, and Mr. E. Guest, whilst later in the year one of our oldest members (Dr. Whittell) passed away. Dr. Whittell occupied the chair at the inaugural meeting of the Section on November 7, 1883, when Professor Tate delivered a lecture explaining its objects. Miss Hussey was one of our most active and enthusiastic workers, and her death was a great loss, not only to the Section, but to numerous scientific correspondents in various parts of the world. Mr. Guest was specially interested in entomology, and this Section recently passed a resolution in favour of his valuable collection of Microlepidoptera being pur-

chased for the Public Museum. Mr. Turner was not an active member, but his sad and sudden death appealed to the sympathy of the members generally.

Proceedings.—At last the connecting links in the printed volumes of proceedings have been completed, and now some account of each year's work, since the inception af the Section, is recorded in type by the issue of the pamphlet distributed to members a few months back.

Financial.—Owing to the cost of the Conversazione and of printing the reports both coming into this financial year, the expenditure has been heavier than usual, viz., £20 5s., while the subscriptions handed to the Royal Society amount to £17. For each of the three preceding years, however, the Section paid to the parent Society £5 more than it received in the way of grants; so that the small deficiency this year is more than counterbalanced, without the Government grant being taken at all into consideration.

Membership.—There has been a considerable increase in the number of members elected during the year. A few of these, however, have not yet gone through the formality of paying any subscription, so that they can hardly be considered full members at present. Owing to death, removal from the colony, or non-payment of subscription, several names have been struck off the roll, which now numbers 95.

EDWIN ASHBY, Chairman.

Adelaide, Sept. 20, 1899. W. H. SELWAY, Hon. Sec.

ELEVENTH ANNUAL REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE OF THE FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA, 26TH SEPTEMBER, 1899.

The Committee have met three times in the past year, but between the meetings much time has been devoted by some of the members to the objects for which they hold office.

Their attention having been specially directed by some letters in the *Register*, signed "Semper Fidelis," to the destruction of trees in the natural forest of Wirrabara, the Secretary was instructed to obtain further particulars; and viewing with alarm the information received, the Committee decided to organise a deputation to the Government on the subject. More than 100 circulars were distributed, mentioning the facts that already out of our forest reserves 65,000 acres had been let on "grazing and cultivation leases," containing no reservation of timber, and that

about 100,000 acres more were included in "grazing leases," of which some of the holders were agitating for conversion into "perpetual leases," with power to destroy the trees. A deputation of about 40, comprising members of the Legislative Council and House of Assembly, and representatives of the Agricultural Bureau, the Australian Natives' Association, the Geographical Society, the Royal Society, the Field Naturalists' Society, the Birds' Protection Society, the Ornithological Association, and others waited upon the Commissioner of Crown Lands on 11th May, and strongly urged upon him the necessity of properly protecting the trees; and the Committee hope that, as a result of their efforts, a large portion of the forests may be saved from destruction.

The Committee having been informed that some persons were permitted to shoot birds upon the Hope Valley Reservoir, the Secretary wrote to the Commissioner of Public Works asking that the use of firearms on the reservoirs of the colony and their enclosures might be strictly prohibited. To this application a courteous reply was received that this request would be complied with and that "the Engineer in-Chief has been given instructions to have notices posted on all water reserves preventing sporting of any kind."

After much delay the Committee are at length able to report that a Birds' Protection Bill has been introduced, by Mr. Playford, into the House of Assembly. The Bill which was prepared last year, but which did not come before Parliament, contained 19 sections, whilst the new one has only 12, having been almost entirely redrawn by the same gentleman, who gave much time and attention to its predecessor. It bears the inscription prepared by "the Committee of the Society for Protection of Birds." With a few amendments this Bill, if carried into law, should give nearly as large a measure of protection to the birds as the Committe could hope for from mere legislation, and with the rapidly growing belief in the usefulness of birds, and desire among landowners to prevent their destruction, much good should result.

W. H. Selway, pro. Chairman.
M. Symonds Clark, Hon. Secretary.

Adelaide, September 25, 1889.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF S.A.

Receipts and Disbursements for the Year, 1898-9.

Dr.

Receipts.	£	s.	d.
To Balance brought forward	4	8	5
" Subscriptions	17	0	0
" Grants from Royal Society	20	0	0
	£41	8	5

Cr.

Disbursements.	£	s.	d.
By Printing—Reports	5	11	0
General	3	14	6
" Postages and Sundries	5	6	9
" Conversazione	4	10	3
" Attendance	1	2	6
	20	5	0
" Subscriptions paid over to Royal Society	17	0	0
" Balance in hand	4	3	5
	£41	8	5

Audited and found correct.

J. S. LLOYD,
S. SMEATON, } Auditors.

Adelaide, 26th September, 1899.

W. H. SELWAY, Hon. Sec. and Treasurer.

ASTRONOMICAL SECTION

OF THE

Royal Society of South Australia.

SEVENTH ANNUAL REPORT.

During the past year there have been held six general meetings of the Section, at which the attendances, though not large, were fairly representative. The lady members deserve special commendation for the interest they showed in those meetings.

The November meteors — principally the Leonids — have occupied the attention of two meetings, and by favour of the Assistant Government Astronomer members have been supplied with charts of the sky for some distance round their radiant point, with hints for observing these showers when crossing the earth's orbit in November, 1899; when the results (if any) will be furnished to Professor Pickering, of Harvard University, U.S.A.

Besides astronomical matters of general interest, papers on the "Seas of the Moon" and "The Dark Areas and Canals of Mars" have been discussed at considerable length.

At a recent meeting it was decided by resolution to obtain four scientific magazines for use of members. These have been ordered, and will be ready for circulation at no distant date.

The astronomical notes (first published in July, 1892) have regularly appeared during the past year; their high character and usefulness have also been maintained.

The Committee have held six meetings for the conduct of business.

The question-box is still open to those desirous of information on any subject.

Adopted at the annual meeting of the Section held at the Adelaide Observatory on the evening of Tuesday, 24th October, 1899.

C. Todd, President.
W. E. Cheesman, Hon. Secretary.

ASTRONOMICAL SECTION OF THE ROYAL SOCIETY, S.A.

Balance-Sheet for Year, 1898-9.

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
To Balance, 1898	9	2	0	By Royal Society	9	10	0
" Grant, Royal	12	0	0	" Postage	2	19	6
" Grant, Royal	15	0	0	" Stationery	1	0	0
" Subscriptions	9	10	0	" Monthly Notes	2	12	0
" Interest	0	10	3	" Composition Roll	0	13	0
				" Balance	29	7	10
	£46	2	4		£46	2	4

Read at Annual Meeting, held 24th October, 1899.

C. TODD, President.

W. E. CHEESMAN, Hon. Sec.

Audited and found correct.

RICHARD F. GRIFFITHS.

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TRANSACTIONS

OF THE

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VOL. XXIV., Part I.

EDITED BY PROFESSOR R. TATE.

ISSUED AUGUST, 1900.

Adelaide:
W. C. RIGBY, 74, KING WILLIAM STREET.

Parcels for transmission to the Royal Society of South Australia, from Europe and America, should be addressed "per W. C. Rigby, care Messrs. Thos. Meadows & Co., 35, Milk Street, Cheapside, London."

TRANSACTIONS AND PROCEEDINGS

AND

REPORT

OF THE

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[With Three Plates.]

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Geological Notes on the Cliffs Separating Aldinga and Myponga Bays.

By Edward Vincent Clark, B.Sc.

[Communicated by Prof. Tate.]

[Read November 7, 1899.]

Travelling southwards along the coast from the Port Willunga Jetty, the Eocene and overlying Miocene both dip downwards, and after a mile or so the Eocene disappears beneath the sand strand ; about half a mile further on the Miocene also reaches to sea-level. Both sets of beds are last seen as reefs between low and high water, but as the dip of the Miocene is the smaller, the reef formed by it is much larger than that of the Eocene, extending a considerable distance both seawards and southwards on the shore, and also a good deal further below sea-level. It is last seen about two miles from Port Willunga Jetty, but is visible somewhat further if the sand has been swept by a storm.

The Post-miocene clays which cap the cliffs then gradually give way to sandhills, which are well overgrown and contain a good percentage of calcic carbonate. The beach is broad, and above ordinary high tide is a bank of shingle, increasing in size as we go south, while the sandhills become smaller. Two miles (roughly) from where the Miocene reef disappears these are no longer covered with vegetation, and behind them is a lagoon in a basin that was formerly an arm of the sea, but which has been reclaimed by the shingle drifting up from the south and the sediment washed down from the Sellick's Ranges. This lagoon is now fresh water, or only slightly brackish when full, but dries up nearly every summer. Dead shells of *Coxiella confusa* are in profusion in the silt.

From this point the sandhills give place to a clayey deposit, still flanked by the bed of shingle (which is much coarser here), and rising somewhat rapidly in height—about one foot per chain. This clay bears a considerable likeness to the mottled clays overlying the Miocene at Blanche Point and the jetty, with the exception that it contains a vast amount of gravel, arranged in more or less horizontal layers. This gravel is mainly of quartzite, shale, and ironstone ; and the pebbles are only slightly worn—most with the corners just taken off, but many quite angular, and a few well-rounded. Owing to the amount of gravel in this clay it will stand at a great inclination, and being by no means in

durated the wash of water has cut it into huge pinnacles, with sides nearly, if not quite, vertical. Where there happens to be little or no gravel, it stands at a much lower angle, and it is in such places that the resemblance is seen to the clays further north. This clay is well seen for upwards of two miles, and before losing its distinctive character, where the Cambrian limestones begin, attains a height of 150 feet or more. Beyond this the clays do not form the escarpment, and so are not prominent, being seen occasionally at the top of the cliffs. As the ground slopes almost without a break from the top of the escarpment to the Sellick's Ranges, these clays must be of immense volume.

Some five and a half miles south of the jetty—a mile south of where these clays first replace the sandhills—is seen a small patch of Eocene polyzoal limestone at their base. This bed is never visibly above 20 feet in height, and is about 600 yards long in all. It is largely worn away at the base, and owing to this its thinness and the weight of the overlying clays—here 80 to a 100 feet in height—it is greatly broken about. The result is that the dip of the bed is hard to estimate, but seems to be five to seven degrees to the south. That the dip is low is shown by the fact that a small extension of this bed as a reef presents a nearly flat surface, not a series of ridges, as is the case further south.

This limestone is of a distinct yellowish tinge, and very pure, over 90 per cent. being soluble in acid, the balance being clay, not sand. It is made up almost entirely of polyzoa, with a fair number of other fossils, but most in such fragments as to be unrecognisable, or at any rate not in a condition to be removed from the rock, which is extremely friable, crumbling under very little pressure. It is greatly undermined by the sea, which reaches it whenever the tide is higher than usual. The reef is, of course, much more indurated, or it could not exist.

For three-quarters of a mile further after the last of this limestone the clays form the escarpment, owing to their easy erosion somewhat back from the beach, and then Cambrian makes its appearance—mainly shale at first. The Cambrian strata here dip at an angle of 75° to the north-west, but the inclination is not well-shown, as, while the coast faces about west, the escarpment is irregular, sloping back from the beach, and somewhat overgrown; also devoid of distinct bands.

Up to this point the coast has run pretty consistently north and south, there being a slight bay from the Miocene reef southwards. Here it takes a sharp turn towards the west, and is henceforth very irregular. There is practically no more beach, the shore-line being either a reef or else piled up with detached boulders, with sometimes a few feet of sand interspersed with rocky debris at the foot of the escarpment.

Three hundred yards further on Eocene again appears overlying the Cambrian. It is here, however, much inclined, dipping to the N.N.W. at an angle of 50° at first, increasing to 65°, and finally diminishing to 45°. It extends seawards for a short distance as a reef, but owing to the high dip it is of no great breadth. Due, however, also to the great inclination, it is extremely regular, and for a 150 yards or so where the cliffs take a bend and run approximately parallel to the direction of strike (W.S.W.) it consists of a series of ridges, parallel to each other and to the shore. One ridge in particular, though only two feet wide, is so uniform that it was keeping the sea inside at a height of 15 to 18 inches higher than outside. In this the reef is very different to that at the small patch of Eocene rocks to the north, and to the reefs south of the Port Willunga Jetty and at Blanche Point. In these cases, where the dip of the rocks is low, the reef either presents a fairly level surface or, if the rock is not quite uniform, a labyrinthine outcrop, the projecting lines of greatest resistance to wear turning and twisting about extremely irregularly, as is so well seen in the Miocene reef at Schnapper Point, south of Port Willunga Jetty.

Opposite to these ridges the face of the cliff is peculiar; as it is approximately parallel to the line of strike, one would expect it to reveal the strata in horizontal bands, but, again owing to the high dip, every projection of a few feet causes a considerable depression in the position of the band on the face of the cliff, and in the same way every recession of a few feet causes a corresponding elevation. The result is that, seeing the escarpment here alone, one would go away with the impression that the strata were highly contorted.

These Eocene beds reach to a considerable height—at their southern extremity over a hundred feet; but are not so high further north.

The lithological character is considerably different from that of the bed before mentioned (though containing pretty much the same fossils), and approaches more nearly to that of the Eocene to the south of the Port Willunga Jetty. The rock is not nearly so full of polyzoa, and yields only 60-70 per cent. soluble in acid, the balance being partly sand, partly clay. It is also more indurated, in places being very hard. Here again fossil collecting is of very little use, everything being broken, and obtainable in fragments only.

After being absent from the face of the cliff for about three-quarters of a mile, the Cambrian again is seen at the foot of the escarpment beneath the Eocene, which extend for about a 100 yards further, their last appearance in the cliff being at an altitude of over a 100 feet. The Eocene reef extends for perhaps a

150 yards more, but after that, as far as I was able to go (about four miles measured along the coast, though much less as the crow flies) no more was visible

The cliffs here, at the end of the Eocene, are of great height, but it is hard to say exactly what. The top of the escarpment is not well defined, and from there the ground slopes directly up to the Sellick's Ranges. Quite close to the cliff, though not right at its edge, I was at an elevation of a 180 feet.

The Cambrian near here dips at an angle of 65° to 70° to the north, the westerly strike being very clearly shown by the bands of quartzite standing out on a small reef at the foot of the escarpment. This reef protects the cliff from the sea's action, and therefore there is here very little loose rock on the shore-line, and the high-water mark is shown by a line of sand some 20 feet wide. Further south the inclination is greater, but still in the same direction. Here the rocks dip at an angle of 75° at the top of the escarpment (here a 100 feet high), and at the base they are vertical or even slightly inclined in the opposite direction, though but a very small part shows this inversion. A little further still the dip is 80°, and strike (as shown by the reef on the beach) W. by S. This reef extends very little further—less than three-quarters of a mile altogether—and after that the beach, or rather the shore-line, presents a tangled mass of boulders. These are some of quartzite, well-rounded, and very smooth; some of a calcareous nature, worn into sharp spikes and projections, painful to walk on; and others, which present the most peculiar appearance, composed of black ferruginous dolomite, which wears away along the lines of stratification into amygdaloidal holes, into which pebbles have often been forced, and too coarse to be seen in hand specimens. This rock does not appear on the face of the cliff, but is very plentiful on the shore-line, not only along here, but also right back to where the Cambrian first appears. Masses of ironstone are also to be met with occasionally.

After the end of the Cambrian reef the cliffs are not nearly so fine, seldom presenting a bold escarpment to the sea, but sloping back somewhat, with frequently a surface coating of clayey soil carrying vegetation. The rock itself, which crops out frequently, also becomes more calcareous in nature. The dip is, therefore, hard to obtain, as even where a fair section is shown there is no reef to show the strike, which is highly important with such a great dip. Occasionally, where the cliff slopes back more than usual, the shore-line becomes more pebbly, with fewer great boulders; and in a few spots a small patch of sand was to be met with. Also, at intervals, there is a jutting point of rock extending right up to the sea, making it difficult to pass, and this appeared to be more frequently the case towards Myponga.

The cliffs here, as mentioned above, are more calcareous than further north (especially the jutting points), where they are mostly pink, purple, brown, or black shales, with bands of quartzite, highly coloured by iron. It is by these quartzite bands that the dip is most apparent, the shales showing stratification lines very poorly.

The following are the distances of the various distinctive points of the coast from the Port Willunga Jetty, as measured by cyclometer :—

	Distance S. of Port Willunga Jetty.	
End of Miocene reef	(say) 2 miles	
End of thickly-clothed sandhills ...	4 "	
Beginning of gravelly clays	$4\frac{1}{2}$ "	
Appearance of Eocene rocks ...	$5\frac{1}{2}$ "	
Disappearance of Eocene rocks ...	$5\frac{5}{8}$ "	
Appearance of Cambrian	$6\frac{5}{8}$ "	
Disappearance of Cambrian and reappearance of Eocene (here highly inclined)	$6\frac{3}{4}$ "	Estimated only.
Reappearance of Cambrian	$7\frac{1}{2}$ "	
Final disappearance of Eocene ...	$7\frac{5}{8}$ "	
End of Cambrian reef	$8\frac{1}{4}$ "	

As mentioned before, fossils are very difficult to collect, owing to their being nearly all in fragments. The following, however, I have identified :—

From the first Eocene bed (of low inclination)—
- Cidaris sp.
- Lovenia Forbesii, *Ten.-Woods.*
- Scutellina patella, *Tate.*
- Fibularia gregata, *Tate.*
- Antedon pertusa, *Tate*, m.s.
- Waldheimia sp. (indet.).

From the second Eocene bed (of high inclination)—
- Cidaris sp.
- Echinus Woodsii, *Laube.*
- Lovenia Forbesii, *Ten.-Woods.*
- Fibularia gregata, *Tate.*
- Echinolampas posterocrassus, *Gregory.*
- Pecten consobrinus, *Tate.*
- Waldheimia sp. (indet.).

New Micro-Lepidoptera—mostly from Queensland.

By A. Jefferis Turner, M.D., F.E.S., Brisbane.

[Read December 5, 1899.]

XYLORYCTIDÆ.

This family is now merged by Mr. Meyrick in the *Gelechiadæ*, but as the Australian *Gelechiadæ*, with the exception of this section, have not yet received systematic treatment, it is convenient to retain the above designation for the present. The present contribution is supplementary to my paper on the "Queensland *Xyloryctidæ*," in the Annals of the Queensland Museum, No. 4, 1897.

PILOSTIBES, *Meyr.*

Forewings with veins 7 and 8 stalked or coincident, 7 to costa.

On reconsideration, I have determined to retain this genus, altering the definition as above, and regarding *P. enchidias*, Meyr., as the type; referring *P. stigmatias*, Meyr., to *Xyloryeta*.

Pilostibes trachyptera, *n. sp.*

Female, 40 mm. Head brown-whitish. Palpi brown-whitish; terminal joint and apex of second joint white. Antennæ grey. Thorax brown-whitish. Abdomen whitish. Legs brown-whitish; anterior tibiæ and tarsi much thickened with scales. Forewings posteriorly dilated, costa rather strongly arched, apex round-pointed, hindmargin straight, slightly oblique; veins 7 and 8 coincident; brown-whitish, suffused with reddish-brown and fuscous-brown, with five or six tufts of raised scales; a dark-fuscous oblique mark on costa at one-fourth; paler fuscous marks on costa at middle, three-fourths, and two more between last and apex; an ill-defined blackish streak in disc above middle, and several fine blackish streaks along veins in posterior portion of disc; cilia brown-whitish, with an incomplete darker basal line. Hindwings brown-whitish; cilia whitish, at apex pale fuscous.

A very distinct species, apparently referable here, but the male is wanted to establish this with certainty. The raised tufts of scales on forewings are a peculiar character.

Palmwoods, Queensland (60 miles north of Brisbane); one specimen taken by Mr. R. H. Relton.

Cryptophaga balteata, *Walk.*

Male. *Zitna balteata*, Walk., Suppl., 1841.

Female. *Cryptophaga lurida*, Meyr., Proc. Roy. Soc., S.A., 1890, p. 37.

Both sexes *Cryptophaga acroleuca*, Turner, Annals Queensland Museum, 1897, p. 8.

I am indebted to Mr. Meyrick for this synonymy.

Cryptophaga opalina, *n. sp.*

Antennal pectinations in male extremely short (one-half), cilia in tufts from pectinations. Veins 6 and 7 of hindwings separate, but closely approximated at base.

Male, 29 mm. Head white. Palpi white; base of second joint fuscous externally. Antennæ dark-fuscous, with a few scattered whitish scales; basal joint white. Thorax white, with a few scattered dark-fuscous scales in patagia, and a large posterior dark-fuscous spot with purple reflections. Abdomen whitish; bases of segments partly ochreous-brown. Legs white; anterior and middle tibiæ and tarsi dark-fuscous, annulated with white. Forewings elongate-oblong, costa slightly arched, apex rounded, hindmargin scarcely oblique, rounded beneath; white; a moderately broad fascia from costa near base, narrowing to inner-margin at one-fourth, produced along costa to base, near costa grey, thence dark-fuscous with purple reflections; an incomplete interrupted line posterior and parallel to this, dark-fuscous with purple reflections; a large fascia from costa before middle, much dilated in disc and on inner-margin, on costa and on posterior margin grey, the remainder a medley of dark-fuscous with purple reflections, ochreous-brown, and white scales; a broad grey line parallel to hindmargin; separated by a fine white line from a broad grey line on margin; cilia dark-fuscous, with a narrow basal white line, at anal angle wholly white. Hindwings grey; towards inner-margin whitish; cilia white, with a basal grey line along anterior half of hindmargin and around apex.

A very distinct and highly beautiful species. The extremely short antennal pectinations render it difficult to distinguish from *Lichenaula*.

Brisbane, Queensland; one specimen at light in November.

Xylorycta assimilis, *n. sp.*

Female, 26 mm. Head white, side tufts and face ochreous-tinged. Palpi whitish ochreous; second joint with a few dark-fuscous scales; terminal joint whitish. Antennæ whitish-ochreous, annulated with dark-fuscous; base of first joint dark-fuscous on upper surface. Thorax white, anteriorly

ochreous tinged. Abdomen whitish-ochreous. Legs ochreous; anterior pair infuscated. Forewings elongate-oblong, costa moderately arched, apex round-pointed, hindmargin straight, oblique; snow-white; costal edge pale-ochreous throughout; a faint ochreous suffusion at anal angle; cilia wholly pale-ochreous. Hindwings whitish-ochreous; apical portion of disc greyish-tinged; cilia pale-ochreous.

This resembles and might be mistaken for *Neodrepta (Xylorycta) luteotactella*, Walk., but may be at once distinguished by the neuration, vein 8 of forewings running to costa, and not to hindmargin, as in that species. It also differs in the absence of orange coloration of face and palpi, and in the ochreous hindwings.

Sydney, New South Wales; one specimen taken in October by Mr. G. Lyell. The type is in his collection.

XYLORYCTA ACROCHROA, *n. sp.*

Female, 20 mm. Head and thorax snow-white. Palpi white. Antennæ whitish-ochreous; basal joint white. Abdomen whitish. Legs whitish-ochreous; posterior tibiæ and tarsi white. Forewings elongate-oblong, costa slightly arched, apex round-pointed, hindmargin straight, oblique; snow-white; a narrow ochreous streak along costa from before middle to three-fourths, slightly broader towards apex, where it ends in a short, very oblique fuscous streak; a small triangular orange-ochreous spot on costa just before apex, bounded beneath by a fuscous line; cilia snow-white, at apex tipped with fuscous, and with a dark-fuscous bar at one-third. Hindwings whitish grey; cilia white.

Conspicuously distinct among the species with white forewings by the apical markings.

Mount Tambourine (1,800 feet), Queensland; one specimen in November.

ZAUCLOPHORA, *n. g.*

Head smooth. Tongue moderate. Antennæ moderate, in male shortly bipectinated throughout, basal joint moderate without pecten. Labial palpi very long, recurved ascending, second joint much exceeding base of antennæ, terminal joint shorter than second, acute. Maxillary palpi very short, appressed to tongue. Thorax smooth. Abdomen moderate. Anterior and middle tibiæ smooth-scaled, posterior tibiæ rough-haired. Forewing with vein 2 from two-thirds, 7 and 8 stalked, 7 to hindmargin, 8 to apex, 11 from middle. Hindwings over 1, veins 3 and 4 short-stalked, 5 parallel, 6 and 7 approximated at base.

A development of *Lichenaula*, from which it is distinguished by the pectinated antennæ of the male. From *Cryptophaga* it differs in the much longer palpi, more slender abdomen, and smoother anterior and middle tibiæ.

ZAUCLOPHORA PELODES, *n. sp.*

Male, 23 mm. Head and thorax ochreous-brown. Palpi dark-fuscous; posterior aspect whitish-ochreous. Antennæ dark-fuscous. Abdomen reddish-ochreous; apices of segments whitish-ochreous. Legs whitish-ochreous; first two pairs dark-fuscous anteriorly. Forewings elongate, costa moderately arched, apex rounded, hindmargin slightly rounded, oblique; ochreous-brown, with ill-defined ochreous-whitish markings; an ochreous-whitish suffusion in disc; an outwardly curved line from costa at two-thirds to anal angle; two ochreous-whitish spots at and before apex, separated by a fuscous spot; hindmargin and anal angle irrorated by fuscous scales; cilia ochreous-whitish, irrorated with fuscous. Hindwings fuscous; towards base suffused with ochreous; cilia whitish-ochreous, with a faint fuscous line at apex and at anal angle.

The type is in poor condition, but the species is a very distinct one.

Brisbane, Queensland; one specimen received from Mr. H. Tryon.

LICHENAULA AMBLYGONA, *n. sp.*

Female, 28 mm. Vein 7 of forewings to hindmargin. Head white. Palpi white; terminal joint mostly fuscous internally. Thorax fuscous, irrorated with white scales. Abdomen ochreous-fuscous. Legs whitish, irrorated with fuscous, except posterior tibiæ. Forewings dilated posteriorly, costa strongly arched, apex round-pointed, hindmargin sinuate; white rather densely irrorated with fuscous; a triangular fuscous suffusion on inner-margin before middle; a short longitudinal suffused mark in disc before middle; a very distinct outwardly oblique line from costa at two-thirds, angulated in disc, and continued parallel to hindmargin to inner margin at three-fifths; an indistinct suffusion on middle of hindmargin; cilia fuscous, at apex white, at anal angle with white apices. Hindwings pale-grey, towards base whitish; cilia grey.

Distinguished from the other species with an angulated posterior line—*L. oxygona*, Luc.; *L. goniodes*, Turn., and *L. micradelpha*, Turn., by the fuscous thorax.

Brisbane, Queensland; one specimen taken by Mr. F. P. Dodd. I am indebted to Lord Walsingham for permission to describe this species, of which the type is now in his collection.

LICHENAULA INSCRIPTA, *Turn.*

Annals Queensland Mus., 1897, No. 4, 21.

Male, 19 mm. Head and thorax white. Palpi white, apex of second joint slightly fuscous-tinged. Antennæ dark-fuscous. Abdomen fuscous; first two rings and apices of segments white;

tuft ochreous-whitish. Legs whitish; anterior pair fuscous. Forewings elongate, costa moderately arched, apex rounded, hindmargin sinuate, moderately oblique; white; markings fuscous; costal edge dark-fuscous towards base, thence ochreous-tinged; a dot on fold at two-fifths; two small dots placed transversely in disc at two-thirds, an outwardly oblique line from costa at two-thirds, narrowing in disc, abruptly bent, and continued suffusedly to anal angle; three dots on apical third of costa; a suffused hindmarginal line, leaving hindmarginal edge white; five or six fine blackish lines, parallel to veins, running into hindmargin; cilia fuscous, darker at apex, with an indistinct whitish median line. Hindwings grey, towards base and at apex whitish; cilia whitish.

Female, 26 mm. Abdomen wholly whitish. Forewings with angulated line replaced by a broad fuscous suffusion, prolonged along fold towards base, its posterior edge sharply defined.

Differs from *L. oxygona*, Luc., by the ground colour not being greyish, and by the numerous longitudinal blackish lines running into hindmargin; also by the dot on fold. Its place in my tabulation should be altered accordingly.

The type was wasted. I have since taken a very perfect male on Mount Tambourine (1,800 ft.), Queensland, in November, and have recived a female taken at Brisbane from Mr. H. Tryon.

Lichenaula tholodes, *n. sp.*

Female, 18-21 mm. Head, thorax, and palpi purplish-fuscous, irrorated with whitish; internal surface of palpi mainly whitish. Antennæ dark-fuscous. Abdomen grey; tuft whitish. Legs whitish; anterior femora, and anterior and middle tibiæ dark-fuscous, irrorated with whitish: anterior tarsi dark-fuscous, with whitish annulations. Forewings oblong, costa moderately arched at base, thence nearly straight, apex rectangular, hindmargin slightly sinuate, scarcely oblique; purplish-fuscous, densely irrorated with whitish, less so along a line from base to anal angle; cilia fuscous. Hindwings with hindmargin sinuate beneath apex; grey; cilia pale-grey, with a darker basal line.

Allied to *L. ignota*, Turn., from which it differs in the purplish-fuscous colouring and absence of markings.

Brisbane, Queensland; two specimens taken at light in January and March.

Maroga mythica, *Meyr.*

Maroga undosa, Lucas, Proc. Linn. Soc., N.S.W., 1893, p. 164.

I sent a specimen of Lucas' species to Mr. Meyrick, who informs me that it is identical with his own.

ESCHATURA LEMURIAS, *Meyr.*

Meyrick, Trans. Ent. Soc., 1897, p. 382.

Phlæophora codonoptera, Turner, Annals Queensland Museum, 1897, p. 23.

Mr. Meyrick's name has a few weeks' priority. Whether my *Phlæophora lactea* is referable to the same genus must be left undecided until the male is discovered.

PROCOMETIS HYLONOMA, *Meyr.*

Procometis acompta, Turn. Annals Queensland Museum, No. IV., p. 30, and *Procometis heterogamà*, Lower, Proc. Linn. Soc., N.S.W., 1899, p. 103, are identical with this species.

Brisbane, Stradbrooke Island, and Warwick, Queensland; Broken Hill, New South Wales. Probably, therefore, a species of very wide distribution. Meyrick records it from Sydney and Bathurst, New South Wales; and Kangaroo Island, South Australia.

AGRIOPHARA NODIGERA, *n. sp.*

Female, 18 mm. Head, thorax, palpi, and antennæ ochreous-whitish, irrorated with fuscous. Palpi very short, not reaching halfway to base of antennæ, terminal joint minute. Abdomen ochreous-fuscous. Legs whitish, sparsely irrorated with fuscous; tarsi and anterior tibiæ annulated with fuscous. Forewings elongate-oval, costa moderately arched, apex rounded, hindmargin very obliquely rounded; whitish, densely irrorated with dark-fuscous, with roundish raised tufts of blackish scales; three in a line from beneath costa at one-sixth to above inner-margin at one-third: three or four in an oblique line from costa at one-third to above middle of inner-margin; just outside this is an ochreous-brown spot in disc before middle; a more obscure curved line of raised dots from costa at one-half to above and before anal angle: just beyond this is an ochreous-brown spot in disc at two-thirds; a very obscure series of dots parallel to hindmargin, not raised: cilia fuscous, with a few whitish scales, and a darker line at one-third. Hindwings fuscous-grey; cilia grey, with a darker line at one-third.

I do not think it necessary to remove this species from *Agriophara*, with which it agrees in neuration, but the peculiar palpi constitute a new section of this genus. The markings are obscure, but the raised blackish dots are characteristic.

Warwick, Queensland; one specimen in October.

ŒCOPHORIDÆ.

The genera here treated of belong to the section of the family without male antennal ciliations, formerly regarded as a separate family, under the name of *Depressariadæ*.

PEDOIS, *Meyr.* (MSS.).

Head with appressed scales, side tufts forming a cone-like projection over face. Antennæ in male simple, pecten absent. Palpi long, second joint exceeding base of antennæ, terminal joint shorter than second, slender, acute. Forewings elongate-oblong, 1 b furcate at base, from junction branching again, lower branch terminating abruptly before reaching margin, 2 and 3 from before anal angle, 6 to apex or costa, 7 and 8 stalked, 7 to costa. Hindwings 1 or slightly over 1, veins 3 and 4 connate, 6 and 7 parallel. Posterior tibiæ long-haired.

I have representatives of six species, which may be tabulated thus—

1.	Vein 6 to costa	2.
	Vein 6 to apex	3.
2.	Forewings with long streaks parallel to veins ...	*tripunctella*, Walk.
	Forewings without long streaks parallel to veins	*cosmopoda*, n. sp.
3.	Second joint of palpi with a minute posterior tuft before apex	*neurosticha*, Lower
	Second joint of palpi without a minute posterior tuft before apex	4.
4.	Hindwings yellow	*eurnorpha*, Meyr.
	Hindwings not yellow	5.
5.	Forewings orange-ochreous	*humerana*, Walk.
	Forewings reddish	*rhodomita*, n. sp.

PEDOIS HUMERANA, *Walk.*

Armidale (3,500 ft.) and Tenterfield (3,000 ft.), New South Wales, in February.

PEDOIS EURNORPHA, *Meyr.* (MSS.).

Armidale (3,500 ft.), New South Wales, in October.

PEDOIS NEUROSTICHA, *Lower.*

Proc. Roy. Soc., S.A., 1894, p. 112.

Gisborne, Victoria, in January; two specimens received from Mr. S. Lyell.

PEDOIS TRIPUNCTELLA, *Walk.*

Brisbane, Queensland, in August and September.

PEDOIS COSMOPODA, *n. sp.*

Male and female, 16-18 mm. Head and thorax grey, irrorated with whitish-grey; face whitish. Palpi whitish; second joint with a dark-fuscous subapical ring, and dark-fuscous basal and medium bars on external surface; terminal joint dark-fuscous anteriorly, posteriorly pinkish-tinged. Antennæ whitish, pinkish-tinged, annulated with dark-fuscous. Abdomen whitish-grey. Legs whitish; anterior and middle tibiæ pinkish, annulated with dark-fuscous. Forewings elongate-oblong, costa strongly arched

at base, thence straight, apex rounded, hindmargin very obliquely rounded; whitish-grey irrorated with dark-fuscous; costal edge pink from base to apex; the irroration is particularly dense along inner-marginal portion of disc, and in posterior portion of disc shows a tendency to form short streaks parallel to veins; cilia whitish, faintly pinkish-tinged, with traces of a medium fuscous line. Hindwings grey, paler towards base; cilia grey.

Closely allied to *P. tripunctella*, Walk, from which it differs in the absence of long discal streaks and the well-marked pink colour of costa and legs.

Sandgate and Wynum, near Brisbane, Queensland; four specimens in August.

PEDOIS RHODOMITA, *n. sp.*

Male, 19 mm. Head whitish, suffused with vinous-red. Palpi whitish; second joint externally suffused with dark-fuscous; terminal joint reddish-tinged; anterior and internal surface dark-fuscous, except at base and apex. Antennæ reddish, with fine blackish annulations, beneath whitish. Thorax whitish-ochreous, reddish-tinged. Abdomen whitish. Legs whitish; anterior pair reddish-tinged. Forewings elongate-oblong, costa strongly arched at base, thence nearly straight, apex rounded, hindmargin obliquely rounded; whitish, irrorated with reddish scales, which form numerous confused longitudinal streaks, a reddish-fuscous dot in disc before middle, a second beyond middle, and a third on fold beneath first; a series of reddish-fuscous dots on apical third of costa and hindmargin; cilia reddish. Hindwings grey, cilia whitish.

Allied to *P. neurosticha*, Lower; very distinct by the reddish colouring.

Mt. Tambourine, Queensland; one specimen taken in January by Mr. C. J. Wild.

PERITORNENTA, *Meyr.* (MSS.).

Head with appressed scales. Palpi long, second joint much exceeding base of antennæ, terminal joint shorter than second, rather stout, acute. Antennæ as long, or nearly as long, as forewings; in male simple, pecten absent. Forewings oblong, with much-rounded apex; 1 b furcate at base, 2 from close before angle, 6 and 7 stalked, 7 to apex. Hindwings 1, veins 3 and 4 stalked, 7 widely separate from 6 at base, somewhat approximated in disc, then slightly diverging.

I have three species referable here—

1. Hindwings ochreous ... ... *cerculatella*, Walk.
   Hindwings not ochreous ... ... 2.
2. Forewings with a series of blackish dots from base to costa at beyond middle ... ... *stigmatias*, n. sp.
   Forewings without a series of blackish dots from base to costa at beyond middle ... ... *thyellia*, Meyr.

Peritornenta circulatella, *Walk.*

Brisbane, Queensland, in October.

Peritornenta thyellia, *Meyr.* (MSS.).

Brisbane, Queensland.

Peritornenta stigmatias, *n. sp.*

Male, 17-19 mm. Head and thorax pale-fuscous; face whitish. Palpi whitish; terminal joint pale-fuscous, except on internal surface. Antennæ whitish. Abdomen ochreous-whitish. Legs whitish; anterior tibiæ and tarsi pale-fuscous. Forewings elongate-oblong, costa strongly arched at base, thence nearly straight, apex obtusely rounded, hindmargin rounded, scarcely oblique; pale-fuscous, with numerous dark-fuscous dots arranged in rows on veins; a line of dots from base to costa beyond middle; a second row from base to inner-margin beyond middle; eight rows in posterior portion of disc; cilia whitish. Hindwings grey, towards base whitish; cilia whitish.

Brisbane and Mt Tambourine, Queensland; two specimens in November and January.

Scorpiopsis superba, *Turn.*

Proc. Roy. Soc., S.A., 1894, p. 133.

I have seen a second specimen of this species taken by Mr. C. J. Wild on Mount Tambourine, Queensland, in February, and now in the Queensland Museum.

PLUTELLIDÆ.

Enæmia dives, *Walk.*

Lactura dives, Walk., Bomb, 486. *Calligenia pilcheri*, Lucas, Proc. Linn. Soc., N.S.W., 1891, p. 279.

Rockhampton, Bundaberg, and Brisbane, Queensland.

Enæmia mixoleuca, *n. sp.*

Female, 18-19 mm. Head white. Palpi dark-fuscous; terminal joint white. Antennæ grey; towards apex whitish-grey. Thorax dark-fuscous; apex of patagia and a large posterior spot white. Abdomen reddish-orange, beneath whitish. Legs whitish; anterior pair dark-fuscous; posterior tibiæ reddish-orange. Forewings elongate, posteriorly dilated, costa moderately arched, apex rounded, hindmargin obliquely rounded; white; markings dark-fuscous; a broad streak along costa from base to one-fifth; a fascia from middle of costa, much widened in disc and on inner-margin, where it extends from one-fourth to three-fourths, and includes a sinuate white bar, widest on margin, followed by a variably developed white dot; anterior edge of fascia strongly sinuate, and connected with costa streak; a second fascia from

costa before apex to anal angle, moderately broad, inwardly curved, and enclosing a small white dot in disc; three dots on hindmargin beneath apex, tending to coalesce, and to be connected with second fascia; cilia white, on markings dark-fuscous. Hindwings reddish-orange, with an apical fuscous blotch: cilia on apical portion fuscous, with a darker line at one-third, towards anal angle reddish-orange.

Gympie, Queensland; three specimens taken by Mr. R. Illidge.

CALLITHAUMA, *n. g.*

Head with appressed scales, slightly projecting anteriorly. Palpi long; second joint exceeding base of antennæ, smooth scaled, somewhat thickened towards apex; terminal joint much shorter than second, slender, acute. Antennæ in male simple, pecten absent. Thorax smooth. Forewings rather narrow, 1 b furcate at base, 2 from four-fifths, 7 and 8 stalked, 7 to apex. Hindwings under 1, cilia two-thirds, veins 3 and 4 connate, 6 and 7 parallel. Posterior tibiæ smooth-scaled. Male genitalia provided with a pair of long curved processes, arising from inferior surface and projecting upwards.

CALLITHAUMA BASILICA, *n. sp.*

Male and Female, 12-13 mm. Head yellow, mixed with reddish on crown. Palpi orange; terminal joint whitish, with a broad subapical dark-fuscous ring. Antennæ whitish, annulated with blackish; base of first joint reddish. Thorax reddish, mixed with pale yellow. Abdomen grey. Legs whitish; anterior tibiæ reddish. Forewings narrow elongate, costa moderately arched, apex rounded, hindmargin very obliquely rounded; bright-red, mixed with purple-fuscous, markings clear yellow, edges of markings mostly clear red; an oblique bar from base of costa; a moderate fascia from costa at one-fourth to inner margin before middle, broadest on costa, somewhat curved in disc; a dot on inner-margin beyond middle, a second dot in disc external to this—these show a variable tendency to connection with a narrow fuscous-edged fascia from costa beyond middle to anal angle; a triangular spot on costa at four-fifths; cilia yellow, at anal angle mixed with red. Hindwings whitish; cilia ochreous-whitish.

Toowoomba and Killarney, Queensland; five specimens in September and October.

PSEUDOTORTRIX, *n. g.*

Head with appressed scales, side tufts rather small. Palpi short, recurved, not reaching base of antennæ; second joint stout, with appressed scales; terminal joint very short, rather

stout, pointed. Antennæ short (half), in male with short ciliations (half), pecten absent. Thorax smooth. Abdomen stout. Forewings posteriorly dilated, apex rectangular, hindmargin not oblique; vein 1 b furcate at base, 2 from near angle of cell, 7 and 8 stalked, 8 to hindmargin, 11 anastomosing with 12. Hindwings over 1; vein 2 from angle of cell, 6 and 7 stalked. Posterior tibiæ smooth-scaled.

I am indebted to Mr. Meyrick for indicating the correct position of the following species, which superficially has a close resemblance to some of the *Tortricidæ*.

PSEUDOTORTRIX ACOSMA, *n. sp.*

Male and female, 16-17 mm. Head and thorax brownish-fuscous. Palpi brownish-fuscous, internal surface of second joint white. Antennæ whitish-ochreous, sometimes fuscous. Abdomen dark-fuscous or brownish-fuscous. Legs whitish. Forewings posteriorly strongly dilated, costa moderately arched, apex rectangular, hindmargin very slightly sinuate, rounded beneath, not oblique; brownish-fuscous, posterior portion of disc sometimes suffused with brownish-ochreous; sometimes a small fuscous erect line on inner-margin at one-fifth; a very irregularly angled fuscous line from costa before middle to inner-margin beyond middle; a fuscous dot in disc at two-thirds; followed by two oblique fuscous lines from costa at three-fifths and four-fifths towards, but not reaching, anal angle and hindmargin respectively—all these markings may be obsolete; sometimes a dark-fuscous line close to upper three-fourths of hindmargin; cilia dark-fuscous, at anal angle paler. Hindwings fuscous-grey; cilia grey, towards apex with a darker line at one-third.

Brisbane, Queensland; from January to May six specimens. I have also a female specimen measuring 20 mm., with forewings suffused with pale-ochreous and without markings, taken near the Jenolan Caves, New South Wales, which may belong to the same species.

TINEIDÆ.

NEMOPHORA, *Hübner.*

This genus has not hitherto been recorded outside Europe, and I was in some doubt as to whether the first species here recorded should be referred to it, as in my solitary specimen the face is damaged and palpi broken. In a second closely allied species received from Mr. G. Lyell these parts are perfect.

NEMOPHORA LEPTOSTICTA, *n. sp.*

Male, 13 mm. Head, thorax, and abdomen pale-grey. Antennæ over three, white. Legs whitish. Forewings posteriorly dilated, costa slightly arched, apex round-pointed,

hindmargin very obliquely rounded; white, with numerous pale-grey dots tending to form interrupted transverse strigulæ; cilia white. Hindwings whitish-grey; cilia white.

Ballandean (2,500 ft.), Queensland; one specimen in February.

NEMOPHORA IOLAMPRA, *n. sp.*

Female, 16 mm. Head, thorax, palpi, and antennæ fuscous. Antennæ over two. Abdomen grey. Legs pale-fuscous; posterior pair whitish. Forewings narrow-elongate, not dilated, costa slightly arched, apex round-pointed, hindmargin very obliquely rounded; pale-grey, with violet reflections; irrorated with fuscous scales, which tend to form transverse strigulæ; cilia whitish-grey. Hindwings and cilia whitish-grey.

Gisborne, Victoria; one specimen taken by Mr. G. Lyell in May.

ZONOPS, *n. g.*

Head and face densely rough-haired. Eyes in male divided by a horizontal ridge of scales into upper and lower segments; lower segments greatly enlarged, closely approximated beneath. Tongue short. Antennæ very long in both sexes, about twice forewings, in male filiform, simple, basal joint with pecten present. Labial palpi moderate, second joint slender, with appressed scales; terminal joint about one-half second, slender, acute. Maxillary palpi absent. Posterior tibiæ rough-haired. Forewings with vein 1 furcate, 2 from near angle, 7 and 8 stalked, 7 to costa, 11 from before middle. Hindwings over 1, veins 3 and 4 connate, 5, 6, and 7 equidistant, parallel.

The structure of the eyes in the male is very remarkable. The horizontal ridge of scales apparently serves to divide the field of vision of each eye into an upper and a lower part.

ZONOPS HETEROLEUCA, *n. sp.*

Male and female, 15-16 mm. Head, face, palpi, and antennæ dark-fuscous; fillet and bases of antennæ whitish in female. Thorax dark-fuscous, patagia pale-fuscous; in female wholly pale-fuscous. Abdomen fuscous; tuft in male white. Legs dark-fuscous, annulated with whitish; posterior pair whitish-fuscous. Forewings narrow-elongate, costa slightly arched, apex round-pointed, hindmargin obliquely rounded; dark-fuscous, with a suffused whitish-grey line along fold, replaced in female by an oblong spot occupying basal two-fifths of inner-margin; a snow-white blotch on costa from three-fourths to apex, containing a few dark scales, its anterior angle connected with a small white spot in disc; in female the apical blotch is prolonged anterior beneath costa as far as disc at one-third; cilia whitish, mixed with pale-fuscous, with a dark-fuscous line at one-third. Hind-

wings two, sinuate beneath apex; dark-fuscous, in female grey; cilia grey, with a dark-fuscous line at one-third.

Brisbane, Queensland; two specimens.

Xysmatodona polymeres, *n. sp.*

Male, 16 mm. Head ochreous-whitish. Palpi dark fuscous. Antennæ dark-fuscous; basal joint ochreous-whitish. Thorax dark-fuscous. Abdomen grey; tuft ochreous-whitish. Legs whitish; antorior pair dark-fuscous, with obscure whitish annulations. Forewings elongate-triangular, costa slightly arched, apex round-pointed, hindmargin obliquely rounded; vein 7 absent; white; markings dark-fuscous; a narrow basal fascia prolonged along costa to one-sixth; an erect spot on inner-margin at one fourth; a moderately broad fascia from costa at one-fourth to before middle of inner-margin, its anterior edge very irregular, deeply excavated in middle; a rather large triangular spot on costa beyond middle, its lower angle nearly meeting a narrow erect spot on anal angle; a triangular spot on costa before apex; several small spots on hindmargin partly confluent; besides these markings there are a few scattered fuscous scales, and the species is probably variable; cilia whitish, faintly ochreous-tinged, on spots bases are fuscous. Hindwings very pale-whitish-grey; cilia whitish.

It appears to resemble *X. hamalitha*, Meyr., but may be distinguished by the wholly pale hindwings.

Brisbane, Queensland; one specimen in July.

Xysmatodona lenceres, *n. sp.*

Female, 18 mm. Head, thorax, palpi, and antennæ white. Abdomen whitish-grey; tuft whitish. Legs whitish-grey; posterior pair whitish. Forewings elongate, costa moderately arched, apex acute, hindmargin very obliquely rounded; 7 and 8 stalked; white, with scattered whitish-grey scales, tending to form transverse strigulæ; cilia white. Hindwings very pale-whitish-grey; cilia white.

Closely allied to *X. pelochra*, Meyr., differing in its white colour. From *X. nephelodes*, Meyr., it may be distinguished by the neuration.

Brisbane, Queensland; one specimen in October.

Xysmatodona pelochra, *Meyr.*

The female is considerably paler in colour than the male, but otherwise similar.

Ardiosteres scoteina, *n. sp.*

Male, 22 mm. Head dark-fuscous. Palpi ochreous, mixed with dark ciliations; fuscous, except towards base and at apex

Antennæ dark-fuscous. Thorax with a large posterior crest; dark-fuscous; apex of patagia and two postero-lateral spots pale-ochreous. Abdomen dark-fuscous; beneath ochreous; tuft large, ochreous-whitish. Legs dark-fuscous, mixed with ochreous. Forewings moderate, posteriorly somewhat dilated, costa rather strongly arched, apex round-pointed, hindmargin obliquely rounded; dark-fuscous, with purplish iridescence; some pale-ochreous scales near base; a pale-ochreous linear mark on costa at two-thirds, with a similar smaller dot beyond it; a whitish erect mark from inner-margin before middle, curving outwardly in disc; a whitish spot on margin before anal angle; a whitish dot above anal angle, and two or three close to hindmargin above middle; cilia dark-fuscous, with a whitish spot just below middle of hindmargin. Hindwings and cilia dark-fuscous.

Mt. Tambourine (1,800 ft.), Queensland; one specimen taken by Mr. Illidge in February.

CHRYSORYCTIS OCHROXANTHA, *n. sp.*

Female, 15 mm. Head pale-yellowish. Maxillary palpi dark-fuscous. Labial palpi dark-fuscous; internal surface whitish. Antennæ dark fuscous. Thorax dark-fuscous, with a small yellowish posterior spot. Abdomen fuscous. Legs pale-ochreous; anterior and middle tibiæ and tarsi dark-fuscous. Forewings elongate, costa moderately arched, apex rounded, hindmargin very obliquely rounded; pale-yellowish; a well-marked dark-fuscous streak along costa nearly to middle, at base reaching inner-margin; a pale-iridescent-purple fascia from costa at three-fourths, broadening beneath, bounded anteriorly by a fine fuscous, nearly straight line to inner-margin at two-thirds, posteriorly ill-defined, and reaching to lower part of hindmargin; included in middle of fascia is a small oval yellowish spot, placed transversely, and edged by fuscous scales; a short broad dark-fuscous streak beneath apex, extending through cilia; some ill-defined hindmarginal fuscous dots above and below streak; cilia whitish, beneath apex and at anal angle dark-fuscous. Hindwings dark-grey, with bronzy reflections; cilia grey.

Distinguished by the pale colouring, large apical area not occupied by purplish band, and dark subapical streak.

Brisbane, Queensland; one specimen in April.

GRACILARIA PARALLELA, *Turn.**

Brisbane, from July to November; attached to *Acacia Cunninghami* and *Acacia aulacocarpa.*

GRACILARIA LACINIELLA, *Meyr.*

Very common in Brisbane from August to October, but

* In the description of this species, for "alternating" read "attenuating."

smaller in size than specimens from Sydney. The larvæ are tapering posteriorly, of a pale-yellowish-green, and nine roundish blotches in the leaves of *Eucalyptus piperita* (?) and *Eucalyptus eugenioides*, on which they are sometimes very abundant.

GRACILARIA TRISTAINÆ, *Turn.*

I have bred this species also from *Eugenia ventenatii*. Like the preceding, the antennæ are porrected in repose.

Brisbane, from September to December.

GRACILARIA OPHIODES, *Turn.*

I took four specimens, all larger and finer than the type, on a fence in Warwick, Queensland, in October.

GRACILARIA POLYPLACA, *Lower.*

Male and female, 10-12 mm. Differs from *G. ida*, Meyr., as follows:—Thorax crimson, with two whitish spots posteriorly, anterior portion wholly crimson. (In *G. ida*, thorax is whitish, with median and lateral reddish lines.) Forewings clear crimson, never suffused with grey; two basal dorsal spots widely separate (in *G. ida* these are usually, if not always, confluent); first costal streak absent, replaced by two discal spots; fourth and fifth costal streaks not touching, but separated by a band of ground-colour; black margins of fifth, sixth, and seventh costal streaks not reaching to costal edge.

Closely allied to *Gracilaria ida*, Meyr., the description of which includes both species, but certainly distinct; formerly described by myself as var. *rosea*. From *Gracilaria formosa*, Stt., as defined by Meyrick, it may be distinguished by absence of pale-yellowish suffusion along costa, absence of spot on fold, and by most of the other points mentioned above.

Brisbane, Queensland; taken abundantly from August to October, and again in April, attached to *Tristania conferta* and *Tristania suaveolens*. *G. ida* I have always found attached to *Eucalyptus piperita* (?), *G. formosa* to *Eugenia ventenatii*.

GRACILARIA ALBICINCTA, *n. sp.*

Male, 8½ mm. Head and thorax pale-ochreous-brown. Maxillary palpi ochreous-whitish. Labial palpi ochreous-whitish; second joint with an apical, terminal joint with a median and subapical dark-fuscous ring. Antennæ longer than forewings, ochreous-whitish, annulated with dark-fuscous. Abdomen ochreous-fuscous; beneath whitish. Legs whitish; apices of tarsal joints fuscous; anterior and middle femora and tibiæ and basal half of posterior femora dark-fuscous, mixed with brownish; middle tibiæ much thickened with scales. Forewings reddish ochreous-fuscous, with scattered dark-fuscous scales; an out

wardly oblique whitish fascia before middle, edges parallel, well defined, with dark-fuscous scales; some half-dozen dark-fuscous dots in fascia; basal part of disc darker coloured than beyond fascia; cilia dark-fuscous, with a whitish subapical line, at anal angle whitish. Hindwings and cilia dark-grey.

Nearest *G. xylophanes*, Turn., but very distinct by the oblique whitish fascia.

Brisbane, Queensland; one specimen in September.

Gracilaria leptalea, *n. sp.*

Male and female, 6-7 mm. Head and thorax whitish. Palpi white; second joint with an apical, terminal joint with a median dark-fuscous ring. Antennæ dark-grey. Abdomen dark-grey. Legs whitish; apex of tarsal joints fuscous; anterior tibiæ and first tarsal joints, outer aspect of distal portion of middle and posterior tibiæ dark-fuscous. Forewings ochreous-fuscous; a white line along inner margin, somewhat dilated at anal angle, much obscured by dark-fuscous scales, especially from one-fourth to middle; a fine line from costa at one-fourth, running closely beneath costa to three-fourths, there bent obliquely across disc to anal angle; its lower margin suffused with dark-fuscous, oblique portion edged on both sides with dark-fuscous; middle third of costal edge narrowly white; an oblique white streak from costa before apex towards middle of hindmargin; cilia white, with a median and apical dark-fuscous line, on anal angle grey. Hindwings and cilia grey.

A minute species, very distinct from any other I have seen. It cannot be *G. albomarginata*, Stt., which is a larger insect without oblique fasciæ.

Brisbane, Queensland; six specimens on a fence in August and September, almost certainly derived from *Acacia Cunninghamii*.

Ornix trigonophora, *n. sp.*

Male and female, 10-11 mm. Head and palpi white. Antennæ grey. Thorax white, sides fuscous-grey. Abdomen grey, tuft white. Legs white, annulated with grey; anterior pair grey. Forewings narrow-elongate; fuscous-grey, markings white: a broad line along inner-margin, its posterior half containing several streaks of ground-colour; three short oblique lines from costa at two-fifths, three-fifths, and four-fifths; a straight fuscous line, with leaden metallic lustre from costa before apex to anal angle; a dark fuscous line around margin at apex, enclosing with the preceding a triangular white area, within which is a greyish-ochreous blotch, containing a central blackish spot: cilia white, at apex with apices dark-fuscous, at anal angle grey. Hindwings and cilia grey.

Mt. Tambourine, Queensland; a dozen specimens taken at one spot in November.

ORNIX ACROBAPHES, *n. sp.*

Male, 11 mm. Head and palpi white. Antennæ grey. Thorax grey (?). Abdomen grey, tuft white. Legs white, annulated with fuscous; anterior pair mostly fuscous. Forewings narrow-elongate; grey, markings white, a broad streak along inner-margin, several very short streaks from costa; ante-apical portion of disc mostly white, containing two short parallel longitudinal dark-fuscous streaks; apical portion white, enclosed in a triangular fuscous line, and containing a grey blotch, with central dark-fuscous spot; cilia white, at apex with apices dark-fuscous, at anal angle grey. Hindwings grey, apical half intense black, the boundary line is irregular; cilia grey.

Closely allied to the preceding, but at once distinguished by the blackish hindwings. The type is not in perfect condition.

Brisbane, Queensland; one specimen in January.

LEIOPRORA, *n. g.*

Head smooth. Tongue short. Antennæ considerably over one, in male simple, basal joint dilated and concave beneath to form eyecap. Labial palpi short, filiform, drooping, pointed. Maxillary palpi rudimentary. Posterior tibiæ with short stiff hairs on upper surface. Forewings with 1 b furcate at base, transverse vein rudimentary, 3 and 4 absent, 6, 7, and 9 stalked, 7 to costa, 8 absent. Hindwings linear, cell open, 3, 4, 5, and 6 absent.

Allied to *Lyonetia*, Hb., and *Phyllocnistis*, Zel. Distinguishable from the former by the smooth head, and from the latter by the long antennæ, also by the neuration.

LEIOPRORA ASCEPTA, *n. sp.*

Male and female, 5-7 mm. Head ochreous-fuscous, face and palpi white. Antennæ greyish, basal joint whitish. Thorax ochreous-fuscous. Abdomen grey. Legs whitish, anterior tibiæ and tarsi fuscous. Forewings narrow-elongate; ochreous-fuscous, with golden reflections; an indistinct fuscous suffusion on base of inner-margin, and another on costa before middle; a suffused fuscous line from inner-margin at two-thirds obliquely through disc to apex; cilia whitish, apices fuscous, at anal angle grey, with a blackish apical dot, edged towards costa with a few golden-metallic scales. Hindwings and cilia grey.

Brisbane, Queensland; taken rather commonly on fences from June to September.

Opostega nubifera, *n. sp.*

Male, 8 mm. Head and palpi white. Antennæ greyish; basal joint white. Thorax white. Abdomen dark-grey. Legs whitish; anterior pair grey. Forewings elongate; white; markings suffused greyish; two rather broadly suffused acutely angulated fasciæ, first before middle, second beyond middle, interrupted in disc; a rather broad grey line around apex and hindmargin; cilia grey-whitish, at apex with basal half white, interrupted by a narrow oblique blackish bar. Hindwings and cilia grey.

Resembles *O. chalinias*, Meyr., but distinguished by the wholly white head, and the rather broadly suffused markings without golden-fuscous-tinge.

Toowoomba, Queensland; one specimen in September.

ELACHISTIDÆ.

Stathmopoda mannophora, *n. sp.*

Male, 14 mm. Head dark-fuscous; face white. Palpi, external surface dark-fuscous, internal surface white. Antennæ whitish-ochreous. Thorax white, with a moderate posterior dark-fuscous spot. Abdomen grey; edges of segments and tuft whitish-ochreous. Legs pale-ochreous; anterior pair fuscous. Forewings white; a moderate dark-fuscous basal fascia; a moderate fuscous-brown fascia from costa at two-thirds to anal angle; cilia on costa whitish-ochreous, at apex fuscous, thence grey, becoming whitish-ochreous again on inner-margin. Hindwings grey; cilia grey, towards base of inner-margin whitish-ochreous.

Allied to *S. pantarches*, Meyr., but at once distinguished by the dark-fuscous head.

Brisbane, Queensland; one specimen in November, taken by Mr. H. Tryon.

Lozostoma asema, *n. sp.*

Female, 10-11 mm. Head dark-fuscous, narrowly edged posteriorly with yellow; face and fillet whitish. Palpi whitish. Antennæ whitish. Thorax bright-yellow. Abdomen grey. Legs whitish; anterior pair fuscous. Forewings bright-yellow; sometimes a minute dark-fuscous dot in disc beyond middle; cilia bright yellow. Hindwings and cilia grey.

Distinguished by the absence of marking.

Brisbane and Mt. Tambourine, Queensland; four specimens in October and November.

Notes on a Collection of Birdskins from Kalgoorlie, W.A.

By Robert Hall.

[Communicated by Professor E. C. Stirling.]

[Read April 3, 1900.]

Kalgoorlie, Alice Springs, and Derby are approximately 1,000 miles from each other, embracing a triangular-like mass of desert-land, of which the bases are about equal and not unlike. As we have a fairly good record of the birds of Derby and Central Australia, it remains for us to provide a list of what species are known to be associated with the South-West position. To Mr. Lindsay Cameron I am indebted for a nice collection of skins. From his memoranda I gather the country is very desert-like, as far as animal life is concerned. It is, in the main, flat, with low rounded hills every few miles, and is covered with short and dry eucalyptus-scrub some 15 feet high. Occasional Casuarinas are seen, with Salsolaceæ interspersed between the gums. Eucalypts, perhaps 50 feet high, are represented with their branches meagrely supplied with foliage. There appears to be no surface water away from the mining camps, which use it only when condensed. The numerous lacustrine beds hold water for a short time, and get it only after irregular thunder storms. "At the present time," Mr. Cameron writes, "the Government of this colony is supplying us from a part some 300 miles distant." From this information we may gather that water-birds will not be mentioned in this present list, and that it is a land in which an Eastern man so much misses the organ-pipe strains of the Magpies *(Gymnorhinæ)* and the piping notes of the Magpie Lark *(Grallina)*.

To deepen the interest, I supply some few field notes of personal observation upon Eastern specimens of the same species.

Those to which the asterisk is added have received notice by the Sir Thomas Elder Expedition, when above Kalgoorlie, and as recorded in the Trans. Roy. Soc., S.A., XVI., p. 156. Eighteen specimens of ten species are there noted as the total ornithological results of that long journey. The Bower-bird (*Chlamydodera guttata*) appears to have been the most important find, and not before or since recorded as found in W.A. The Cockatoo *(Cacatua roseicapilla)* was at that time noted as well, this being one of three field observations in the West to date. Recorded now as found in West and South-West Australia is the yellow-

throated Minah (*Manorhina flavigula*). It has probably made its course from the centre of the Eyrean sub-region, where it has long been known to exist. The species received by myself are 33 in number. Mr. Cameron has noted in addition ten species. Of the ten species recorded by the Elder Expedition further North, seven are found near Kalgoorlie township.

CERCHNEIS CENCHROIDES, *Vig.* and *Hors.*

Tinnunculus cenchroides, V. and H.; *id.*, Gould, Bds. Austr., fol. vol. I., pl. 13.

Cerchneis cenchroides, Sharpe, Brit. Mus. Cat. Bds., I., p. 431; Hall, "Key to the Birds of Austr.," p. 3.

Adult skin (unsexed), December, 1898. Bars on tail feathers almost obsolete. Both sexes take part in incubation, the male sitting in the hollow of another tree during the night and relieving its mate in the task of incubation during the day. The young when ready to fly are without the yellow cere.

HIERACIDEA ORIENTALIS, *Schlegel.*

Hieracidea berigora, Gould., Bds. Austr., fol. vol. I., pl. 11.

Hieracidea orientalis, Sharpe, Brit. Mus. Cat. Bds., vol. I., p. 422; Hall, "Key to the Birds of Austr.," p. 3.

One juvenile skin received.

PACHYCEPHALA GILBERTI, *Gould.*

Pachycephala gilberti, Gould, Bds. Austr., fol. II., pl. 71; Gadow, Brit. Mus. Cat. Bds., vol. VIII., p. 210; Hall, "Key to the Birds of Austr.," p. 34.

a. Skin, male, 16/10/'98. This specimen does not show a black pectoral collar.

b. Skin, immature male, 26/9/'99. Upper surface with a slight disposition to ashen grey on crown and back, throat and abdomen greyish-white, chest and breast grey, lores grey, wings greyish, tips of primaries being brown; tail grey, upper-tail coverts clear grey, under wing coverts sandy buff. Length of wing, 3·75 ins.; tail 3·5 ins."

On September 1st a nest was found containing four eggs, three being the hitherto recorded number to a clutch. The nest was composed of small sticks and bark, the measurements being—Exterior diameter, 6 ins.; depth of cavity, 4 ins.; total depth, 6 ins.; depth of cavity, 2 ins. Height of nest from ground, 5 feet.

ACANTHIZA APICALIS, *Gould.*

Acanthiza apicalis, Gould, Bds. Austr., fol. vol. III., pl. 57; Sharpe, Brit. Mus. Cat. Bds., VII., p. 296; Hall, "Key to the Birds of Austr.," p. 25.

Skin, adult male, 14/8/'98.

It is a plentiful bird here.

Sericornis brunnea, *Gould.*

Pyrrholæmus brunnea, Gould, Bds. Austr., fol. vol. III., pl. 68.
Sericornis brunnea, Sharpe, Brit. Mus. Cat. Bds., VII., p. 302 ; *id.*, Hall, "Key to the Birds of Austr.," p. 26.
Skin, adult male, 12/3/'99. *Loc.*—Golden Ridge.

Micræca assimilis, *Gould.*

Micræca assimilis, Sharpe, Brit. Mus. Cat. Bds., vol. IV., p. 124 ; Hall, "Key to the Birds of Austr.," p. 13.
Adult skin (unsexed), 16/10/'98.

Pomatorhinus superciliosus, *Vig.* and *Hors.*

Pomatorhinus superciliosus, Gould, Bds. Aust., fol. vol. IV., pl. 22 ; Sharpe, Brit. Mus. Cat. Bds., vol. VII., p. 419 ; Hall, "Key to the Birds of Austr.," p. 29.
a, *b*. Male and female, 19/3/'99.
c, *d*. Immature skins, 17/1/'99, 19/3/'99.

Xerophila, *sp.*

The one skin received does not agree with any of the known species as described. *X. leucopsis* is the only species of the genus in Western Australia, and with that it has very little agreement. A provisional description was given by the writer in the "Victorian Naturalist," XVI., No. 2.

Cinclosoma castanonotum,* *Gould.*

Cinclosoma castanonotus, Gould, Bds. Austr., fol. vol. IV., pl. 5.
Cinclosoma castanonotum, Sharpe, Brit. Mus. Cat. Bds., VII., p. 333 ; Hall, "Key to the Birds of Aust.," p. 27.
Adult skin, male, 2/12/'98. The back and rump feathers are dull chestnut, compared with the rich chestnut of the Eastern birds in my cabinet.

Climacteris rufa, *Gould.*

Climacteris rufa, Gould, Bds. Austr., fol. vol. IV., pl. 94 ; Gadow, Brit. Mus. Cat. Bds., VIII., p. 335 ; Hall, "Key to the Birds of Austr.," p. 35.
Adult skin, male, 24/7/'98.
The common tree-creeper of this district.

Climacteris superciliosa, *North.*

Climacteris superciliosa, North, "Horn Exp. Cent. Aust.," Zool., plate ; Hall, "Vic. Nat.," vol. XVI., No. 11 ; *id.*, "Key to the Birds of Austr.," p. 35.
a. Skin, male, 30/10/'98. *b*. Skin, female, 24/11/'98.
I am in receipt of a skin from Nannine, N.W.A., and dated 30/7/'99. It is probably a female, and shows the two central

tail feathers to be brown rather than grey, the colour of the upper tail coverts.

PETRŒCA BICOLOR, *Vig.* and *Hors.*

Petroica bicolor, Gould., Bds. Austr., fol. vol. III., pl. 7.

Petroica bicolor, Sharpe, Brit. Mus. Cat. Bds., vol. IV., p. 173; Hall, "Key to the Birds of Austr.," p. 14.

Adult skin (not sexed), 11/12/'98.

The habits of this bird are very different to those of the other members of this family, and one would scarcely know it to belong to the Robins. It pipes its trilling notes from early to late, and when other Robins are in the shade, this is most actively chasing and capturing grasshoppers. It freely associates with other birds (as the Artamidæ). Amongst birds in general, there appears to be security in numbers.

PETRŒCA GOODENOVII, *Vig.* and *Hors.*

Petroica goodenovii, Gould, Bds. Austr., fol. vol. III., pl. 5.

Petroica goodenovii, Sharpe, Brit. Mus. Cat. Birds, vol. IV., p. 171; Hall, "Key to the Birds of Austr.," p. 13.

a. Adult skin, male, 20/1/'99. *c.* Skin, juv. male, Dec., 1898.
b. Immature skin. *d.* Skin, juv. female, Dec., 1898.

(*a*). It is blacker on the throat and duller on the breast than the Eastern skins in my collection. The forehead "reds" bear the same relation to the breast "reds" in each.

(*b*). It has the basal frontal mark duller than in (*a*) and much less of it. The breast red is dull, throat brownish-black.

(*c*). It has only a trace of red on the forehead and pectoral regions; throat, crown, and nape greyish-brown.

(*d*). It has a faint trace of red on the forehead, none on the breast.

The plumage of what are called the Red Robins is quite imperfect at the close of 12 months, yet in this phase they nest and rear a family. Immature birds in Victoria have nested in August of different years. Matured birds will breed twice in a season with two to three eggs laid on successive days. Incubation lasts 14 days, during which the disturbed bird will often feign injury when you approach the nest. Mr. J. A. Hill, of Kewell, in a letter to me gives the time between the starting of nest-building to laying of first egg as ten days. On February 15, 1899, I secured a young male skin in Victoria showing the change from the brown plumage to the showy one. The tawny feathers of the forehead had mostly given way for the brilliant reds; one patch of brownish feathers remained on the chest, while all the others either had "burst their buds" or were doing so into bright-red. Excepting the middle feathers, all the others of the tail were short and irregularly graduated. The brownish

wing primaries were giving way to the black quills in order from the first; the earthy plumes of the remaining parts of the body were making place for the blacks; abdomen and lower tail coverts were already white.

Gould proved *P. leggii* to moult its "reds" annually. A new supply shows out almost patch for patch in *P. phœnicea* in February (skins, 26/1/1900, described Roy. Soc. of Vic.). The song of this species is clear and strong, like *P. leggii*, but is much sweeter and of a different setting.

ARTAMUS PERSONATUS, *Gould.*

Artamus personatus, Gould, Bds. Austr., fol. vol. II., pl. 31; Sharpe, Brit. Mus. Cat., Bds., vol. XIII., p. 16; Hall, "Key to the Birds of Austr." p. 48.

Immature skin, female, 24/11/'98. The mask is not so well defined as in adult skins, and the outer borders of the primaries are edged with light-brown.

This species, like *Corvus coronoides*, places outposts as an act of prevention when bellicose birds are in the neighbourhood. They change their sentinels irregularly, but are always sure to have some three to four birds perched on an elevated position watching the interests of the general body of feeders below. Others fly up at intervals to take up the duty. If an enemy, say in the shape of a Crow-shrike, appears, the sentinels' necks croon forward, and discordant calls, louder and in quicker time than is usual, are given. The colony is on the wing at once in readiness for an attack, and they certainly seem to think discretion is the better of valour, for away they go to take up a position elsewhere. A very similar observation has been communicated to me by Mr. Geo. Graham concerning *A. superciliosus*. In this case the enemy seemed specially to be the White-backed Crow-shrike (*G. leuconota*).

ARTAMUS SORDIDUS, *Latham.*

Artamus sordidus, Gould, Bds. Austr., fol. vol. II., pl. 27; Sharpe, Cat. Bds. Brit. Mus., vol. XIII., p. 19; Hall, "Key to the Birds of Austr.," p. 48.

a. Skin, female, 14/8/'98. No white in third primary—indicates not quite mature. Second primary longer than first.

b. Skin, nestling male, 10/12/'96. The upper and under surfaces brown, streaked and spotted with dusky white, much stronger on the upper; wings deep slate, second and third primary edged with clear white on the outer webs, coverts wedge-marked with brown at tips; tips of primaries clearly marked by white, also shoulder of wing, both of which entirely disappear in the adult; distal third of rectrices white, bill brown, legs and feet slatey-brown. Length of wing, 3·1 ins.; culmen, 0·4 ins.; tail, 1·5 ins.

The following portion of their gregarious habit is specially interesting :—*Roosting for the Night.*—Usually in fine weather the sheltered side of a rough shell of an old tree is selected. When cold nights prevail, a stump, so burnt that the upper part forms an inverted funnel, is then chosen. The interest is to watch the shuffling upward movements of the birds as they move towards and enter the hole. While those on the stump are getting safely housed, their numbers are added to by more that are flying about and watching their opportunities. Sometimes the hole is not large enough to hold all ; they then cluster in a great bunch (like a bee-swarm when at rest) beneath the dome. Hence the generic name *Artamus*, and a previous reference under other conditions. Should a person pass too near, there is a nerve-startling rush, such as a tree falling close to you would produce, and the process of camping has to be repeated.

PARDALOTUS ORNATUS, *Temm.*

Pardalotus striatus, Gould, Bds. Austr., fol. vol. II., pl. 38.

Pardalotus ornatus, Sharpe, Brit. Mus. Cat. Bds., vol. X., p. 55 ; Hall, "Key to the Birds of Austr.," p. 46.

a, *b*. Skins, adult male and female, 4/9/'98.

COLLYRIOCINCLA RUFIVENTRIS, *Gould.*

Collyriocincla rufiventris, Gould, Bds. Austr., fol. vol. II., pl. 75 ; Sharpe, Brit. Mus. Cat. Bds., vol. III., p. 292 ; Hall, "Key to the Birds of Austr.," p. 11.

a. Skin, adult female, 14/8/'98.

b. Skin, immature female, 4/9/'98.

(*a*). General plumage brownish-grey, lores and other parts corresponding with the tint of brown over most of the grey. Bill black ; length, 0·9 inch.

(*b*). General colour of plumage grey, lores and other parts agreeing, except region of vent and under tail coverts, which correspond with those of *a*. Bill light-horn, blacker along the culmen ; length, 0·75 inch.

The immature female has the eyebrow like its surroundings in colour.

TAENIOPYGIA CASTANOTIS, *Gould.*

Amadina castanotis, Gould, Bds. Austr., fol. vol. III., pl. 87.

Tæniopygia castanotis, Sharpe, Brit. Mus. Cat. Bds., vol. XIII., p. 311 ; Hall, "Key Bds. Austr.," p. 50.

Skin, male, 20/11/'98. Forehead and crown uniform grey ; under portion of tail deep brown.

That this species is a "host" of the cuckoo, *Chalcococcyx basalis*, is now placed on record. Mr. Cameron writes—"A colony of the chestnut-eared Finch had its nests sprinkled about, some having

eggs, and others vacant. In one of the latter I found the cuckoo's egg (skin since received). I left it, and several days after (November 19) I visited the nest, and found no other eggs added. The Finches had deserted. In one tree there were as many as 30 nests. In the split spout of a eucalypt the nest is occasionally built." A favourite situation in the orient is at the base of a Crow or Hawk's nest, and the Finch and Hawk perch within a foot of each other amicably. One nest had a clutch of nine eggs. Sometimes the rudely-built nests meant for the non-sitting bird will contain eggs. The compactness of the nest will depend on the surroundings and its material. Several nests placed in polygynum were very small and slightly built. It prefers open and dry country, although its presence is indicative of water not being far away. Mr. J. P. Rogers has communicated to me a field note of value. Inland from the Fitzroy River two of us had a terrible thirst experience, and, although we watched a hundred of this bird, we could not find water along the creek bed. Watching carefully a dozen, we saw them settle in the bowl of the lowest fork of a large mulga, and, following them, we found about two tablespoonfuls of water in it. This is about what is saved from a slight thunderstorm, and we are pleased to acknowledge the service rendered by a species of Finch.

Ephthianura tricolor,* *Gould.*

Ephthianura tricolor, Gould, Bds. Austr., fol. vol. III., pl. 66; Sharpe, Brit. Mus. Cat. Bds., vol. VII., p. 667; Hall, "Key Bds. Austr.," p. 30.

Skin, adult male.

This Chat appears in great numbers at Kalgoorlie by the end of October, and begins to depart towards the end of December. Further North *E. aurifrons* has been noticed (Elder Exp.).

Oreoica cristata,* *Lewin.*

Oreoica gutturalis, Gould, Bds. Austr., fol. vol. II., pl. 81.

Oreoica cristata, Gadow, Brit. Mus. Cat. Bds., VIII., p. 174; Hall, "Key Bds. Austr.," p. 32.

a. Skin, juv. male, 13/3/'99. Forehead brownish-grey, crest feathers light black and less in number than in the adult; back less ruddy than in adult; throat fawn-grey, with two whitish feathers on the gorget; one to two blacks showing on breast; winglet new.

b. Skin, adult male. The forehead is black, while the lores are the creamy colour of the throat. The lores of *a* are brownish, like the forehead, with a flush of grey over them.

The call of the young differs from that of the adult, and Mr. Cameron clearly distinguishes it from the call of the Eastern

bird. The aborigines of W.A. have noted two settled calls. This supports the statement of Dr. Stirling and Mr. Zeitz (Roy. Soc., S.A., XVI., p. 156) that they are the calls of young and old of the same species. A nest with three eggs was hidden in a group of young leaves.

Cracticus destructor, *Temm.*

Cracticus destructor, Gould, Bds. Austr., fol. vol. II., pl. 52; Gadow, Brit. Mus. Cat. Bds., vol. VIII., p. 100; Hall, "Key Bds. Austr.," p. 32.

By examining a series of skins, I find the most developed male may be recognised by the white throat, grey back, flanks and sides of upper breast greyish-white; culmen, 1·62 inches. The development is from deep-brown on the dorsal region to black and grey; from light-brown on the under surface to a nearly clear white under surface in the adult. The brown barring on the young is displaced by the faint blue-grey on the sides of the breast in the adult.

a. Skin, juv. male, 11/12/'98. The feather-shafts from the forehead to the interscapulum are rufous-brown.

b. Skin, female fledgling, about three days out of nest, 20/11/'97. Head, neck, and back deep-brown; rump light-brown; upper tail coverts light-brown, barred with deep-brown; centres of cheek feathers light-brown; sides of neck show brown patches; lores brown; throat, abdomen, and under tail coverts white, tinged with brown; chest and breast brown and brownish-white, the brown forming blotches and bars; wings deep-brown, secondaries and coverts edged with pale-rufous; tail brown, tipped with white, tinged with pale-rufous; bill brownish-black at the base, brown at the tips; legs slatey-brown. Length of wing, 4·3 ins.; tail, 2·8 ins.; culmen, 0·85."

Ptilotis ornata, *Gould.*

Ptilotis ornata, Gould, Bds. Austr., fol. vol. IV., pl. 39; Gadow, Brit. Mus. Cat. Bds., vol. IX., p. 244; Hall, "Key Austr. Bds.," p. 43.

a. Skin, adult female, 4/9/'98. *Loc.*—Golden Ridge.

b. Skin, adult female, 16/10/'98. *Loc.*—Kalgoorlie Centre. The two centre tail feathers were very much decomposed.

c. Skin, immature, 2/4/'99. *Loc.*—"Hannan's Lake." General plumage browner than in *a* or *b*. More yellow on wings; breast more heavily blotched with brown; edges of inner webs of primaries edged with fulvous. New tail quills were developing, and the bird was concluding its autumn moult.

Manorhina flavigula, *Gould.*

Myzantha flavigula, Gould, Bds. Austr., fol. vol. IV., p. 79.

Manorhina flavigula, Gadow, Brit. Mus. Cat. Bds., vol. IX., p. 261; Hall, "Key Austr. Bds.," p. 44.

Skin, adult female, 5/3/'99. Length of wing, 4·7 ins.; tail, 4·5 ins.

This bird was concluding its moult, and the innermost quill was "bursting." The winglet feathers had their sheaths still attached.

The finding of *M. flavigula* in West or S.W. Australia is now placed on record, and the law of representation with this genus, as defined by Gould, is a little interfered with. In likely probability it has journeyed from the central portion of the continent.

Glycyphila albifrons, *Gould.*

Glycyphila albifrons, Gould, Bds. Austr., fol. vol. IV., pl. 29; Gadow, Brit. Mus. Cat. Bds., vol. IX., p. 211; Hall, "Key Bds. Austr.," p. 39.

a. Immature skin, 27/11/'98.

b. Immature skin, male, 27/11/'98. Forehead black, a few of the lateral feathers feebly tipped with slatey-white; around eye black, a faint ring of white appearing; crown black; narrow line leaving angle of lower mandible, white; ear coverts silvery-slate, behind which is an irregular line of white; chin feathers dusky-black, edged with impure white; primaries and primaries-coverts-margins yellowish-green; under surface of wing fulvous; upper tail coverts rufous, central parts black; abdomen, flanks, and under tail coverts whitish, with centres of feathers narrowly marked with brownish-black; bill, legs, and feet black. Wing, 3 ins.; tail, 3 ins.; tarsus, 0·8 ins.; culmen, 0·65 ins.

Entomphila leucomelas, *Cuvier.*

Melicophila picata, Gould, Bds. Austr., fol. vol. IV., pl. 49.

Entomophila leucomelas, Gadow, Brit. Mus. Cat. Bds., vol. IX., p. 220; Hall, "Key Bds. Aust.," p. 40.

Skin, adult female, 19/10/'98.

Cuculus pallidus, *Latham.*

Cuculus inornatus, Gould, Bds. Austr., fol. vol. IV., pl. 85.

Cuculus pallidus, Shelley, Brit. Mus. Cat. Bds., vol. XIX., p. 261; Hall, "Key Bds. Austr." p. 58.

Skin, adult male, 4/9/'98.

The male skins in my cabinet appear to fall into three phases in the development of the plumage:—

a. Young, in which white predominates throughout the plumage, the feathers being broadly edged and dentated by the white; quill tips also white; the pigment of the plumage beyond the white patches is blackish-brown. Bill nutty-brown; culmen, 0·65 in.

b. Immature, in which white does not predominate throughout the plumage. The feathers are narrowly edged with white, and

feebly dentated by the white; quill tips not edged with white other than the third, and that slightly so. The pigment of the plumage as a whole is dark-brown. Bill blackish; culmen, 0·8 in.

c. Adult, in which there is little white throughout the plumage, the feathers not being edged with white, and some of the quills and rectrices alone dentated with white; plumage generally light-brown. Bill blackish; culmen, 0·85 in., and broader at nostrils than in *a* or *b*.

Chalcococcyx basalis, *Horsf.*

Chrysococcyx lucidus, Gould, Bds. Austr., fol. vol. IV., pl. 89.

Chalcococcyx basalis, Shelley, Brit. Mus. Cat. Bds., vol. XIX., p. 294; Hall, "Key Bds. Austr.," p. 59.

An egg only of this bird was sent to me, but subsequently I was personally able to collect the species just N.E. of Albany.

Misocalius palliolatus, *Latham.*

Chalcites osculans, Gould, Bds. Austr., fol. vol. IV., pl. 88.

Misocalius palliolatus, Shelley, Brit. Mus. Cat. Bds., vol. XIX., p. 279; Hall, "Key Bds. Austr.," p. 59.

Skin, adult female, 4/9/'98.

Halcyon pyrrhopygius, *Gould.*

Halcyon pyrrhopygia, Gould, Bds. Austr., fol. vol. II., pl. 22.

Halcyon pyrrhopygius, Sharpe, Brit. Mus. Cat. Bds., XVII., p. 258; Hall, "Key Bds. Austr.," p. 57.

The adult skin dated December, 1896, has a pale-green head and a clear white nuchal collar.

Psephotus multicolor, *Temm.*

Psephotus multicolor, Gould, Bds. Austr., fol. vol. V., pl. 35; Salvadori, Brit. Mus. Cat. Bds., vol. XX., p. 566; Hall, "Key Bds. Austr.," p. 67.

a. Skin, adult female, 11/12/'98.

b. Skin, adult male, 11/12/'98.

c. Skin, adult male, 15/3/'99.

a, *b*, and *c* indicate three distinct phases of the plumage:—

(*a*) Primaries, secondaries, their coverts, the tail and its coverts very much decomposed.

(*b*) General plumage above olive, as well as upon the throat and chest; breast light-green; abdomen lemon-green; shoulder feathers dull-red.

(*c*) The olive of (*b*) is bright-green; abdomen orange and yellow; shoulder feathers bright-yellow, illustrating xanthochroism.

Specimen (*b*) would need to go through another moult to

obtain a brighter frontal yellow band, a clearer red upon the shoulders, and more white upon the tail feathers to become fully adult.

Barnardius zonarius, *Shaw.*

Platycercus bauri, Gould, Bds. Austr., fol. vol. V., pl. 20.

Barnardius zonarius, Salvad., Brit. Mus. Cat. Bds., XX., p. 560; Hall, "Key Bds. Austr.," p. 66.

Adult skin, 19/2/'99. The specimen was concluding a moult, for the last of the yellow feathers of the breast were "bursting." All but the outer three quills have a maculated line upon the under surface of the wing. In the South-West this species nips off the blossoms of the eucalypts when they have once been explored for nectar. It is not improbable that this is the means for saving the labour of re-examining a flower. Thousands of blossoms daily fall by this means.

Melopsittacus undulatus, *Shaw.*

Melopsittacus undulatus, Gould, Bds. Austr., fol. vol. V., pl. 44; Salvad., Brit. Mus. Cat. Bds., vol. XX., p. 594; Hall, "Key Bds. Austr.," p. 68.

Skin, adult male, 16/10/'98.

The species flocks into the district in July, and pairs in October, as far as noted. The skin received showed an inner quill missing from one wing, and one strangely growing from the lower back. It appeared to be identical with the missing one. The not unusual occurrence of a snake entering the nest of a bird occurred under Mr. Cameron's notice, and the four eggs were eaten by the reptile, after which it slept for several hours in the nest.

The following species have been recognised by Mr. Cameron, without the skins being forwarded to the writer:—

Uroaëtus audax, Latham.
Falco melanogenys, Gould.
Corone australis, Gould.
Graucalus melanops, Latham.
Podargus phalænoides, Gould (?).
Eupodotis australis, Gray.
Dromæus novæ-hollandiæ, Latham.
Cheramœca leucosternum, Gould.
Plectrorhynchus lanceolatus,* Gould.
Gymnorhina dorsalis, Camp.
Rhipidura tricolor, Vieill.

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* Not yet recorded as a W.A. species.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

XXVI.

[Read May 1, 1900.]

CARABIDÆ.

CLIVINA.

C. eyrensis, sp. nov. Minus convexa; sat nitida; brunneo-testaceus; mandibulis brevibus; clypeo ab "alis" distincto, quam hæ magis producto, antice fere truncato ad extremitates angulato; oculis sat (fere ut *C. Bovillæ*, Blackb.) convexis; prothorace quam longiori paullo latiori, fortiter anguste canaliculato, antice leviter angustato, latera versus transversim leviter rugato vix punctulato, foveis posticis fere nullis; elytris sat æqualiter sat profunde striatis, striis parum manifeste punctulatis, stria quinta antice cum externis conjuncta; tibiis anticis extus tridentatis. Long., $2\frac{4}{5}$ l.; lat., $\frac{9}{10}$ l.

From the characters mentioned above it will be seen that this species falls into the group called by Mr. Sloane (Proc. L.S., N.S.W., 1896, p. 151) the "*obliquata* group." Of the species included in that group and known to Mr. Sloane only one species (*C. Riverinæ*) agrees with the present one in being of sub-depressed form, and with its prothorax wider than long; from which the present insect differs notably by *inter alia* the fifth and sixth elytral striæ deeply impressed throughout their whole length (and not, or scarcely, less strongly impressed than the other striæ), by the almost complete absence of elongate foveæ near the base of the pronotum, and by its more convex eyes. From the species of the *obliquata* group not known to Mr. Sloane (of all of which the types are in my collection) *C. eyrensis* differs by its much more convex eyes.

S. Australia; near Lyndhurst (Lake Eyre basin), taken by Herr Koch.

C. Adelaidæ, Blackb. I take this opportunity of mentioning that this insect appears to me to be the species that Mr. Sloane identifies with *C. obliquata*, Putz. Mr. Sloane (*l.c.*) gives his reasons for thinking that *obliquata* is founded on an insect not

very readily recognisable by its author's description,—reasons that seem to be on the whole conclusive,—and therefore *C. Adelaidæ* must be quoted, I think, as a synonym of *obliquata*.

CYLCOTHORAX.

C. peryphoides, Blackb. Mr. Sloane in a recent valuable paper (P.L.S., N.S.W., 1899, p. 563) discusses the relation of this insect to his new species *C. cordicollis*, and mentions my having stated that the latter is distinct from it, proceeding to conjecture the distinctive characters. I fear, from this, that I must have answered his enquiries hurriedly and without giving my reasons for considering the two distinct,—for which if it was so I certainly owe him my apologies,—though it is possible he may have mislaid remarks I may have written on the subject and only remembered that I reported the two species as both valid. In point of fact they are closely allied but (apart from the great difference in the colour of the legs,—a character worthy of note when accompanied by structural divergence) the form of the prothorax furnishes a perfectly satisfactory distinction. In *cordicollis* the lateral margins of that segment (the short sub-basal parallel-sided part being disregarded) diverge for considerably more than half their length so that the greatest width of the segment is in front of the middle even of the part with curved sides, whereas in *peryphoides* the corresponding part of the lateral margin is an even curve, the greatest width of the prothorax being exactly at the middle of the curve, with the result of a very different facies,—the prothorax looking distinctly more transverse in *peryphoides* than in *cordicollis*, although careful measurement shows it to be only very slightly so. The lateral outline of the prothorax of *peryphoides*, if the short parallel sided basal piece be disregarded, is exactly like the lateral outline of that segment in *C. ambiguus*, Er. In *peryphoides*, moreover, the form of the whole insect is wider and less convex,—more robust-looking.

LAMELLICORNES.

CEPHALODESMIUS.

C. minor, sp. nov. Niger, antennis palpisque pallidis; sat opacus; clypeo brevius 4-dentato, dentibus medianis quam ceteri paullo longioribus; prothorace transverso, sat crebre minus fortiter punctulato, leviter canaliculato (canali antice obsoleto), ad latera ampliato-depresso, parte ampliata ad medium tuberculo parvo instructa, lateribus paullo ante medium et sat longe pone medium perspicue angulatis (inter angulos fere rectis sed retrorsum leviter convergentibus), angulis anticis sat acutis posticis fere rectis; elytris subsulcatis (ut *C. armigeri*, Westw., sculpturatis), setis brevibus crassis ferrugineis sparsim vestitis.

Maris pygidio sat convexo, opaco (apice anguste nitido), minus perspicue punctulato, setis ut elytra vestitis ; tibiis posticis manifeste flexuosis.

Feminæ pygidio planato, ut maris sculpturato et vestito, parte postica nitida in medio retrorsum angulatim dilatata ; tibiis posticis haud flexuosis. Long., 4½ l.; lat., 3 l.

Closely allied to *C. armiger*, Westw., but a little smaller, with the clypeal teeth shorter, and having the outline of the prothorax notably different. The lateral margin of that segment runs from the front angle obliquely hindward and outward, then making a well-defined angle runs nearly straight (but slightly inward) nearly to the base where it makes another angle, from which it runs very obliquely to the base. The outline between the front margin and the anterior of the lateral angles is almost strongly (and that between the lateral angles slightly) concave. Of the other described species of *Cephalodesmius*, *Castelnaui*, Har., and *Macleayi*, Har., are described as having nitid lævigate areæ or tubercles on the disc of the prothorax ; *quadridens*, Macl., has the front part of the head impunctulate ; *cornutus*, Macl., has the clypeal structure altogether peculiar, and *laticollis*, Pasc. (which is very slightly described) is stated to be much larger than the insect before me (long., 7 l.) with the prothorax wider than the elytra (in the present insect it is by measurement slightly narrower than the elytra), and it is implied that the prothorax is of the same shape as in *armiger*.

N.S. Wales ; Richmond R. (sent by Mr. Lea).

C. armiger, Westw. The male of this species has the hind tibiæ scarcely flexuous and the pygidium very similar to that of *C. minor*, while the pygidium of the female resembles that of *C. minor* in having a nitid apical space dilated hindward in the middle,—but the shape of the dilatation is very different in the two species, being in *minor* a small triangular space in the middle of the narrow nitid edging of the segment, while in *armiger* the subtriangular nitid space covers the whole apical portion of the segment,—the lines that meet in an angle on the middle line of the segment having their other extremities at the lateral ends of the nitid space,—their angle thus being widely obtuse, while in *minor* it is acute.

LABROMA.

L. horrens, Shp. Mr. Lea has recently sent to me for identification a specimen of this insect. Dr. Sharp (Rev. and Mag. de Zool. 1873, p. 262) in characterising the genus stated that the type had no front tarsi, but that very probably they had been broken off. The example before me has front tarsi very similar o those of *Cephalodesmius*, to which genus it is very close.

PLATYPHYMATIA.

S. squalidus, Macl. Among some specimens sent to me by Mr. Cowley which agree very well with Sir W. Macleay's description of this insect, and which were taken in the same locality as the type, I find a single example, which I take to be the female. It agrees with the male in all respects of sculpture, &c., except in the anterior elevation of its prothorax being much less strong, its pygidium notably less gibbose, and its hind femora unarmed.

OCNODUS.

O. lepidus, sp. nov. Ferrugineus, clypeo picescenti, antennarum clava dilutiori; nitidus; fortiter punctulatus, elytrorum puncturis quam ceteræ manifeste majoribus; clypeo antice subrotundato; prothorace quam longiori duplo latiori, antice parum angustato, angulis anticis productis minus acutis posticis obtusis, lateribus leviter rotundatis, basi vix lobata; elytris obsolete tricostatis, haud setosis; tibiis anticis extus tridentatis. Long., $4\frac{1}{2}$ l.; lat., $2\frac{1}{3}$ l.

Differs from *O. spinicollis*, Blackb., and *fallax*, Blackb., *inter alia* by the obtuse hind angles of its prothorax, from *O. decipiens*, Burm., and *ferrugineus*, Blackb., by the absence of setæ on the upper surface, and from *lugubris*, Blackb., by the very much less close puncturation of its pronotum. The upper margin of the labrum is distant from that of the clypeus (as in *O. fallax*). The sculpture of the upper surface is in all parts very similar to that of *O. fallax*. It should be noted in respect of this insect (as I have pointed out in describing other species that I have attributed to *Ocnodus*) that it is possible it is not really congeneric with *O. decipiens*, Burm., a species that I have never been able to identify.

S. Australia; basin of Lake Eyre (taken by Herr Koch).

HETERONYX.

H. unicus, sp. nov. Sat brevis; sat latus; modice convexus; nitidus; subglaber, lateribus corpore subtus pedibusque sparsimpilosis; pallide brunneo-testaceus; capite confertim rugulose, prothorace sparsius sat fortiter, elytris inæqualiter (*i.e.*, puncturis sat grossis et aliis minoribus inæqualiter intermixtis), pygidio vix manifeste, punctulatis; clypeo fortiter reflexo antice late rotundato, sutura clypeali minus distincta; prothorace quam longiori fere duplo latiori, antice minus angustato, lateribus sat rotundatis pone medium vix subsinuatis, basi media late leviter lobata, angulis anticis parum productis posticis obtusis; elytris costis sat obsoletis circiter 4 instructis, his quam interspatia magis sparsim punctulatis; tibiis anticis extus 3-dentatis; labro clypeum

haud superanti ; antennis 9-articulatis ; coxis posticis quam metasternum multo brevioribus ; unguiculis appendiculatis, parte basali quam apicalis vix longiori. Long., 4½ l.; lat., 2½ l.

An extremely distinct species notable for the apical piece of its claws being scarcely shorter than the basal piece, and the peculiar sculpture of its elytra, each of which bears about four longitudinally convex spaces extending from near the base to near the apex. On these convex portions the puncturation of the general surface is partially interrupted resulting in the elytra having a striate appearance which is most unusual in the genus. The punctures of the elytra are for the most part coarse, but with a confused and irregular intermingling of considerably less coarse punctures. In my tabulation of the section of *Heteronyx*, to which this species belongs (P.L.S., N.S.W., 1891, pp. 488-9) it falls beside *H. Froggatti*, Macl., from which it differs *inter alia* by the uniformly close rugulosity of its head.

S.A.: taken by Herr Koch near Lyndhurst.

ANACHEIROTUS (gen. nov. *Sericoidarum).*

Mas? Mentum quam latius longius, antice parum emarginatum ; palpi labiales breves, articulo ultimo obconico ; palpi maxillares modici, articulo ultimo cylindrico ad apicem truncato, quam penultimus multo longiori ; labrum angustum valde transversum, late leviter arcuatum, vix prominulum, a clypei parte antica (hac fere ut *Haplopsis* subtus retrorsum obliquum) bene discreta ; oculi magni sat distincte granulati, antice a cantho profunde incisi ; antennæ (speciei typicæ) 9-articulatæ, clava 3-articulata articulis præcedentibus 4 conjunctis longitudine sat æquali ; clypeus supra antice valde reflexus et late emarginatus (nonnihil ut *Haplopsis lineoligeræ*, Blanch., mas) ; prothorax transversus ; elytra elongata nullo modo striata (stria subsuturali excepta) ; tibiæ anticæ extus obtuse leviter tridentatæ, posticis modice latis (fere ut *Haplopsis lineoligeræ*, Blanch.) sed pone medium fortiter transversim carinatis ; tarsi breves robusti (quam tibiæ parum longiores) ; unguiculi valde bifidi ; sterna sat glabra ; coxæ posticæ quam metasternum parum breviores.

The small *Lamellicorn* for which I propose this new generic name is extremely difficult to place, as it combines the characters of very widely different genera. Its short stout tarsi are like those of the genus that I take to be *Ocnodus* (except in not being clothed beneath with tufts of long hair) from which it differs strongly in most other characters. Its clypeus and mouth organs suggest *Haplopsis*,—but there the resemblance ends. Its claws are those of a *Heteronyx* but its mouth organs and clypeus

(especially its extremely narrow,—almost linear,—non-prominent labrum) separate it widely from *Heteronyx*. In my tabulation of the Australian *Sericoid* genera (Tr. R.S., S.A., 1898, pp. 32-4) it must take its place beside *Heteronyx*,—which is perhaps its most natural position. To include it in the tabulation, the following must be substituted for line 25 on page 34 :—

FF. Form notably more convex.
G. Labrum largely developed and prominent ... *Heteronyx*.
GG. Labrum extremely narrow and not prominent ... *Anacheirotus*.

A. inornatus, sp. nov. Totus pallide testaceus; supra sparsim breviter pubescens, lateribus longe ciliatis; sat nitidus; clypeo crebre subtiliter, capite postice fortius minus crebre, prothorace fortiter sparsim, elytris quam prothorax magis crebre paullo minus fortiter, pygidio sparsim minus fortiter, punctulatis; clypei lateribus ante oculos fortiter angulatis; pronoto transverso, antice parum angustato, lateribus leviter rotundatis, angulis anticis leviter acutis posticis rotundatis. Long., 2 $\frac{4}{5}$ l.; lat., 1$\frac{1}{5}$ l.

The clypeal canthus cuts into the eye to a little in front of its middle, and its lateral margin is strongly angular behind, the apex of the angle projecting a trifle beyond the outline of the eye.

S. Australia (Basin of Lake Eyre); taken by Herr Koch, near Farina.

ANOPLOGNATHUS.

A. concinnus, sp. nov. Mas? Sat brevis; minus convexus; nitidissimus; supra glaber, corpore subtus pygidioque sparsissime albido-pilosis; supra brunneo-castaneus plus minusve viridi-micans, corpore subtus obscure viridi vel cyaneo plus minusve violaceo-micanti, metasterno medio (exemplorum 2 visorum) splendide aureo, antennis palpis pedibusque castaneis; supra sparsim subtiliter punctulatus, elytris puncturis paullo majoribus lineatim leviter impressis, pygidio ad latera paullo magis perspicue punctulato; clypeo antice sat fortiter elevato-reflexo, rotundato; antennarum clava quam articuli præcedentes 5 conjuncti sublongiori; prothorace fortiter transverso, antice modice angustato leviter emarginato, postice fortiter bisinuato (lobo mediano haud emarginato), lateribus fere rectis, angulis anticis vix acutis posticis sat abrupte rectis; elytris ad apicem conjunctim late rotundatis; mesosterni processu elongato, acuto; tibiis anticis externe 3-dentatis, dentibus apicalibus 2 approximatis inter se, dente 3° (hoc paullo ante tibiam mediam sito) subobsoleto; unguibus ad apicem acutis haud fissis. Long., 6$\frac{1}{2}$ l.; lat., 3$\frac{1}{3}$ l.

This species is the smallest *Anoplognathus* yet described, being

a little smaller than *A. abnormis*, Macl., but otherwise does not appear to differ from its typical congeners, either structurally or in *facies*. In Sir W. Macleay's grouping of the *Anoplognathi* (Tr. E.S., N.S.W., II., pp. 353-4) it should be placed, I think, in the group containing *rugosus*, Kirby, *pectoralis*, Burm., and *dispar*, Macl., from all of which it differs widely *inter alia* by the subobsolete puncturation of its elytra.

N. Queensland; Mr. French.

BUPRESTIDÆ.

STIGMODERA.

In the Ann. Soc. Ent., Belg., 1898, there is a lengthy paper by M. Kerremans containing descriptions of a large number of new *Buprestidæ*, chiefly from Australia. Having recently been revising the *Stigmoderæ* of my own collection, and of the South Australian Museum, I have taken the opportunity to study M. Kerremans' late work somewhat closely as far as concerns the genus *Stigmodera*, and in the following notes I record the result, and add some remarks on certain other *Stigmoderæ*, together with the description of some new species.

S. triangulosa, Kerr. (*l.c.*)=*terræ-reginæ*, Blackb. (Tr. Roy. Soc., S.A., 1893, p. 295). It seems to me doubtful whether both these names will not have to be dropped in favor of *S. biguttata*, Macl. (Trans. Ent. Soc., N.S.W., I., p. 24)—a name that was applied to an insect which (judged by the description) might well be a variety of the species I (and subsequently M. Kerremans) described under the above names.

S. campestris, Kerr., nom. præocc. (Blackb, Tr. Roy. Soc., S.A., 1897, p. 31) I propose for it the name *subgrata*. In spite of its being, as M. Kerremans points out, extremely close to *S. grata*, Saund., the apical truncature of its elytra *inter alia* seems inconsistent with its being a mere variety.

S. sensitiva, Kerr. (*l.c.*)=*S. victoriensis*, Blackb. (Tr. Roy. S., S.A., 1890, p. 152).

S. laudabilis, Kerr. (*l.c.*). Judging by the description I should say this insect is *S. Skusei*, Blackb. (Tr. Roy. S., S.A., 1892, p. 46).

S. verax, Kerr. (*l.c.*). This species must be very close to (if not identical with) *S. Mastersi*, Macl. (Tr. Ent. Soc., N.S.W., II., p. 245).

S. colorata, Kerr, (*l.c.*), nom. præocc. (Hope, Tr. Ent. Soc., Lond., 1847, p. 283). I propose the name *dulcis* for this handsome species, of which there is a fine example in the S.A. Museum.

S. acuminata, Kerr. (*l.c.*). This species seems to be without doubt identical with *S. acutipennis*, Thoms.

S. placens, Kerr (*l.c.*). Evidently identical with *S. cara*, Blackb. (Tr. Roy. Soc., S.A., 1892, p. 216).

S. rigilans, Kerr. (*l.c.*). I have before me specimens from Victoria (M. Kerremans' locality) which agree very well with the description of this species. They appear to me, however, to be merely a variety of *S. rectifasciata*, Saund.

S. consularis, Kerr. (*l.c.*).=*S. guttaticollis*, Blackb. (Tr. Roy. S.A., 1892, p. 157).

S. addenda, Kerr. (*l.c.*). I can find nothing in the description of this insect to distinguish it from *S. pallidipennis*, Blackb. (Tr. Roy. Soc., S.A., 1890, p. 154). *Addenda*, moreover, is a nom. præocc. (Thoms. Typ. Bupr., 1878, p. 52).

S. bucolica, Kerr. (*l.c.*). The description of this species does not indicate any difference from *S. Sieboldi*, L. and G.

S. tacita, Kerr. (*l.c.*). The habitat of this species is given merely as "Australia" I have examples from Eyre's Peninsula of a *Stigmodera* that agrees very well with the description, and which I have regarded doubtfully as a variety of *S. Kirbyi*, Guér., but on reconsideration I think it is a good species.

S. ocularis, Kerr. (*l.c.*). I cannot find anything in the description of this insect to distinguish it from *S. lilliputana*, Thoms.

S. mansueta, Kerr. (*l.c.*) The habitat given is merely "Australia." I have specimens from W. Australia which fit the description very satisfactorily.

S. crocipennis, Hope (Bupr., p. 6). This species seems to be generally regarded as identical with *S. rufipennis*, Kirby. It appears, however, to me to be more probably the allied *S. parallela*, Saund.

S. dawsonensis, Blackb. In Tr. Roy. Soc., S.A., 1892, p. 220, I expressed a doubt whether this might not prove to be an extreme variety of *S. lilliputana*, Thoms. It is, however, a good species.

S. tasmanica, Kerr. (C.R. Soc. Ent. Belg., 1890, p. 2). This insect is certainly I think one of the innumerable varieties of *S. Stricklandi*, Hope, of which I have many specimens from Hope's locality (Morialta, near Adelaide), and also from Tasmania and other localities in Southern Australia. Lightly coloured examples agree with Hope's description in having flavous elytra each marked with a dark spot, below the shoulder a median dark fascia, and a large dark blotch filling the apical one-fourth of the elytra and bearing a small reddish or yellow spot in its middle. There is a still lighter variety in which the spot in the dark apex is much enlarged, and another in which it becomes a fascia cutting off a dark fascia from the front of the apical dark blotch. Other specimens are darker than the type,—the subhumeral dark spot enlarging till it becomes a fascia and

the median fascia becoming more or less wider than in the type. These last-named examples agree with the description of *tasmanica* in having the elytra dark violaceous with three pale fasciæ. I have specimens of the above forms taken in company quite promiscuously, from Tasmania as well as S. Australia, Victoria, and Southern N.S. Wales. Whether this insect is identical with *S. Mitchelli*, Hope, appears to me very doubtful in spite of Mr. Saunders' assertion of its identity, for he says that *Mitchelli* has elytra unarmed at the apex (which is not the case with the present species) and Hope mentions a fovea on the pronotum near the hind angle which is not to be found in the present insect. The type of *S. Mitchelli* was from W. Australia, and I have not seen *S. Stricklandi* or anything like it from that colony. *S. Stricklandi* may be distinguished from all the other hitherto described *Stigmoderæ* as follows: apex of elytra truncate and feebly bi-acute, prothorax dark with lateral margins pale, under surface dark (except sides of prothorax and of abdomen and sometimes a spot on the hind coxæ), elytra having transverse zones of dark and pale colouring (more than two zones pale, the apex dark) their interstices moderately convex and their apical points feeble, head scarcely concave longitudinally. All the numerous varieties (that I have seen) of *Stricklandi* are covered by the above description, and I know of no other species that it will fit.

S. ostentatrix, Thoms. This insect is very near *Stricklandi*, but is a good species, differing by, *inter alia*, its strongly costate elytral interstices and strong sutural spine at the apex of its elytra, as well as in the colouring of its prothorax. I have a fine example of it in my collection, but do not know its exact habitat, which seems to have been unknown to M. Thomson also; there is an example also in the S.A. Museum marked "W.A.?"

S. Karattæ, Blackb. In Tr. Roy. Soc., S.A., 1890, pp. 149-50, I pointed out the distinctions of this species from *S. Stricklandi* (which I called *S. Mitchelli* on Saunders' authority, though I now doubt the identity.) If *S. Mitchelli* be distinct from *S. Stricklandi*, *Karattæ* is still distinct from *Mitchelli*, being very differently marked and coloured from the type and (even if *Mitchelli* prove to be variable in colour and markings) differing also, *inter alia*, in the absence of a fovea near the hind angles of the pronotum.

S. rugosipennis, Thoms., Arch. Ent., 1857, p. 111. This seems to be clearly a synoym of *S. obscuripennis*, Mann. Bull. Mosc., 1837, p. 32. I believe this synonymy has hitherto escaped notice.

S. Carpentariæ, Blackb. This seems to be the insect referred to by Mr. Waterhouse [Ann. Nat. Hist. (s) VII.] as a local form

of a specimen previously mentioned by him as a var. of *S. viridicincta*, Waterh. (Tr. Ent. Soc., Lond., 1874, p. 543.) I have not seen the var.? last named, but am quite satisfied that *S. Carpentariæ* is distinct from *S. viridicincta*, as it differs not only in colouring and pattern (which are very widely distinct) but in numerous other characters also, *e.g.*, its prothorax notably more strongly transverse, the striæ of its elytra more closely punctured, the extero-apical tooth of its elytra less acute.

S. elegantula, White (Stoke's Journ., I., p. 507.) Its author, after describing this species, says "near *coccinata*, Hope." I cannot find any difference at all in the two descriptions indicating that they are not founded on one and the same species. Hope, it is true, calls the antemedian mark on the elytra a spot (not reaching the suture) whereas according to White it is a fascia narrowed by a deep notch before reaching the suture, but there are so many species of *Stigmodera* in which an antemedian dark marking consists of a fascia liable in varieties to be broken up into isolated spots that no specific value can be attributed to the character, and I can find no other to fall back upon. The species is a very distinct one, with no close allies as yet described.

S. Pascoei, Saund. This magnificent insect is stated by its author to occur in "Australia," without the mention of any more exact habitat. I have seen an example in the collection of Mr. W. W. Froggatt, which was taken at Kalgoorlie, in Western Australia.

S. cærulea, Kerr. In Mem. Soc. Ent. Belg., 1892, M. Kerremans proposes this name as a substitute for the nom. præocc. *cælestis*, Kerr. I, however, had in 1890 (Tr. R.S., S.A., p. 148) proposed the name *stillata* for it.

S. flavescens, Masters (*flava*, Thoms.). M. Kerremans (Mem. Soc. Ent., Belg., 1892, p. 148) makes this identical with *S. flava*, Saund. The latter species I am familiar with, and it is correctly described as having the apex of each elytron rounded. *S. flavescens* is described as having the apex of each elytron bidentate. Unless Thomson's description is actually incorrect the two can hardly be identical.

S. capucina, Blackb. I find that this is a nom. præocc. having been used by Thomson (Rev. and Mag. Zool., 1856, p. 46) for an insect that appears to be identical with *decipiens*, Westw. However, I subsequently (Tr. R.S., S.A., 1894, p. 141) described under the name *Caroli* a *Stigmodera* which I was eventually satisfied must be regarded as a var. of my *capucina* (*l.c.*, 1897, p. 31) and consequently *Caroli* becomes the name of the species that I originally named *capucina*.

S. carinata, Macl. M. Kerremans (Mem. Soc. Ent., Belg., 1892, p. 145) gives this name as a synonym of *S. plagiata*, Gory.

I have before me several examples of Macleay's insect, and am inclined to think them distinct from *plagiata* though undoubtedly very close to it. The form of the common apical dark blotch on the elytra seems constantly different,—in *carinata* filling the whole apex (its front margin on each elytron a more or less sinuous line running from the suture obliquely hindward and outward to the lateral margin), while in *plagiata* it does not fill the whole apex but is a square spot the front margin of which runs out transversely towards the lateral margin of the elytron, and at a considerable distance from it meets (at a right angle) the lateral margin (of the spot) which runs hindward as a straight line parallel to the suture to join the lateral margin of the elytra, reaching it at a very short distance from the apex (of the elytra). In *plagiata* but not in *carinata* the lateral margin of the elytra is of a red colour distinctly brighter than the colour of other parts of the surface, and the pronotum of *carinata* is evidently more gibbous than that of *plagiata* with the central longitudinal line considerably more strongly impressed.

S. insignicollis, sp. nov. Sat elongata; minus lata; pone medium minus fortiter dilatata; sat nitida; supra glabra, subtus pilis minus brevibus albidis plus minusve dense vestita; splendide aureocuprea (nonnullis exemplis plus minusve viridi-micantibus) prothoracis macula magna discoidali (hoc basin nec apicem attingenti) læte violacea; elytris rufo-auarantiacis notas cyaneo-nigras præbentibus [sc. fascia postbasali angusta margines laterales haud attingenti (hac exemplorum nonnullorum in maculas 2 vel 3 divisa), fascia mediana curvata (antrorsum convexa), et macula communi præapicali (hac formam variabili) cum fascia mediana secundum suturam connexa vel haud connexa]; capite sat brevi, crebre subgrosse punctulato, longitudinaliter concavo; prothorace quam longiori ut 7 ad 5 (postice quam antice ut $6\frac{1}{2}$ ad 4) latiori, in parte violaceo sparsius subfortiter nec rugulose (in parte cetera fortiter rugulose confluenter) punctulato, lateribus arcuatis juxta basin sinuatis, angulis omnibus acutis, basi sat fortiter bisinuata; elytris striatis, striis punctulatis, interstitiis sat fortiter convexis sat fortiter (ut striæ) punctulatis, apice oblique emarginatis, parte emarginata externe quam ad suturam multo magis fortiter acuminata, lateribus postice subtiliter crenulatis. Long., 6—$8\frac{1}{2}$ l.; lat., $2\frac{1}{5}$—$3\frac{1}{5}$ l.

The most distinctive character of this species consists in the very remarkable colouring and sculpture of the prothorax. The disc is occupied by a large violaceous spot (which, however, does not reach the front margin) on which the puncturation is smooth and not close, while the rest of the surface is of a brilliant golden

copper colour, and is coarsely and confluently rugulose. The pattern on the elytra (apart from colour) resembles roughly that of *S. cyanicollis*, Boisd., as figured by Mr. Saunders (*loc. cit.*) but the fasciæ or spots are not connected by dark colouring on the suture, except in occasional examples having the median fascia and præapical spot connected. In some specimens, however, the three spots placed transversely across the sub-basal part of the elytra are narrowly confluent so as to form a fascia, and the shape of the common præapical spot varies from circular to semi-circular.

W. Australia (taken near Cue by Mr. Ellershaw).

S. quadrifasciata, Saund. I met with a few specimens (evidently identical with the insect on which this species was founded) in Central Australia on the flowers of a small shrub (unknown to me by name) near the Cecilia Creek. It is a variable species, both the basal and subapical fasciæ of the elytra having a tendency to break up into isolated spots placed in a transverse row. In Saunders' description the colour of the abdomen is given as "olivaceous" as distinguished from the cyaneous remainder of the under surface, while in my three examples the under surface is uniformly cyaneous, but as in all other respects my examples agree absolutely with the figure and description (allowing for the variation in the elytral pattern in two of them as noted above) I have no doubt the recorded colouring of the abdomen is either sexual or occasional.

S. rubriventris, sp. nov. Modice elongata, minus convexa, pone medium modice dilatata; sat nitida; supra glabra, subtus sparsim argenteo-pilosa; ænea, elytris rufis notas cyaneas præbentibus [sc., maculas 3 postbasales transversim positas (e his mediana communi late ad basin producta, his in exemplis nonnullis fere confluentibus), fasciam postmedianam integram cum macula postbasali mediana anguste in sutura connexam, et maculam apicalem communem subtriangularem (hac cum fascia postmediana anguste in sutura connexa et ad apicem summam dilatata)], antennis pedibusque violaceis, abdomine rubro ad basin ænescenti; capite sat brevi, crebre fortiter punctulato, longitudinaliter concavo; prothorace quam longiori (et postice quam antice) ut 12 ad 7 latiori, crebre sat fortiter (ad latera subrugulose) punctulato, in medio anguste interrupte longitudinaliter lævi, lateribus pone medium fortiter dilatato-rotundatis, angulis anticis acutis posticis rectis, basi leviter bisinuata; elytris striatis, striis subtiliter punctulatis, intersitiis antice parum (postice fortiter) convexis sparsim (latera versus magis crebre) punctulatis, ad apicem acuminatis haud (vel oblique vix manifeste) emarginatis, lateribus haud crenulatis; unguiculis modicis fortiter divergentibus. Long., $6\frac{1}{2}$ l.; lat., $2\frac{1}{2}$ l.

In one of the two specimens before me the lateral two of the three postbasal elytral spots are widely separated from the median spot; in the other specimen they are all but confluent with it; I have no doubt these spots are liable to become a fascia. The apical spot is a triangle with its apex at the apex of the elytra, but its extreme apex is dilated so as to cover narrowly the whole elytral apex. The postmedian fascia is notably wider in one specimen than the other; it crosses the elytra at right angles to the suture and (in that sense is straight, but) its margins are sinuous. Among the species having the head and prothorax of uniformly dark colour the elytra red with three zones of dark colouring, the abdomen uniformly red except base, and the apex of the elytra not distinctly emarginate; the present species is recognisable by the following characters in combination, —size not less than $4\frac{1}{2}$ l. nor more than $9\frac{1}{2}$ l., elytra separately acuminate at the apex.

W. Australia; sent to me by Mr. French.

S. insignis, Blackb. In the diagnosis of this species (Tr. Roy. Soc., S.A., 1892, p. 217, line 3 of the diagnosis) "ante basin" should be "ante apicem." "Ante basin" being of course nonsense, and the term "subapical" in the remarks following the diagnosis being evidently applied to the same marking that *ante basin* is applied to in the diagnosis, probably any reader would discern that *ante basin* must be a *lapsus calami*, but it is better to draw attention to it here.

S. filiformis, Blackb. In the diagnosis of this species (Tr. Roy. Soc., S.A., 1892, p. 218, line 8) for "suture" read "lateral margin."

S. cincta, Blackb. (*rubrocincta*, Kerr., nom. præocc). "Australia" is the habitat attributed to this species. I have an example from W. Australia.

S. obesissima, Thoms. (Typ. Bupr., App. I., 1879, p. 32), is clearly a synonym of *S. Saundersi*, Waterh. (Ann. N.H., 1876, p. 70). This synonymy has not been previously recorded.

S. flavipennis, Géhin. My collection and that of the S.A. Museum contain specimens of what I take to be this insect. They vary into a form which is possibly *S. elegans*, Géhin,—though none of them quite agree in markings with the figure of the latter insect. They are certainly not varieties of *S. Yarrelli*, L. and G. (as *flavipennis* and *elegans* are said to be) from which —disregarding the totally unlike colouring of their elytra—they differ by the presence of long white hairs on their head and thickly clothing their sterna, as well as by the very much closer puncturation of their prosternal process. There is a doubt, it is true, about the identity with *flavipennis* of the specimens before me because the pilosity of their sterna is quite dense, whereas

Géhin speaks only of "quelques poils rares;" because their form is notably shorter and wider than the form of *Yarrelli*, while Géhin seems to say that *flavipennis* is "narrower and longer than *Yarrelli*,—but it is not quite clear he may not mean that *Yarrelli* is narrower and longer than *flavipennis* (which is the more likely since *Yarrelli* is a particularly narrow and elongate species); and because their sterna and hind coxæ are variably (but always considerably) variegated with yellow, whereas in *flavipennis* they should be entirely green. The last-named discrepancy is of less consequence inasmuch as Géhin's description is evidently carelessly written containing the statement that the "ventre et bords postèrieurs des segments abdominaux" are of a beautiful green colour. The ventral segments of the specimens before me are yellow, with their (except the apical one) hindmargins green. Géhin says that *S. flavipennis* is allied to "*Yarrelli* and *flavipennis*" (the latter name obviously a misprint). The species I am discussing (and for which I claim the name *flavipennis*, Géhin, until the claim may be shown erroneous by an inspection of Géhin's type) is smaller than *Yarrelli* (Long., 9—10 l.) and notably less narrow and elongate. Its under surface and legs are considerably more closely punctulate, its sterna quite densely clothed with long white hairs. Its head is pilose, the sutural apex of its elytra bears a distinct (though not long or very sharp) spine limiting a distinct (though feeble) truncation of the apex of each elytron. Its colours and markings are very similar to those of *Yarrelli* except on the elytra where they are quite different. The elytra vary from uniform reddish testaceous (except the extreme base) to a form in which there is a small common sutural cyaneous spot a little behind the scutellum, a row of four cyaneous spots placed transversely (two on each elytron) slightly behind the middle and a narrow cyaneous edging of the apex. The insect is found in S.W. Australia. It is to be noted that in the type of *Yarrelli*, Hope (as described by Mr. Saunders, Tr. Ent. Soc., Lond., 1868, p. 32), and in examples in my collection the apex of the elytra is simply rounded, while in other specimens before me (otherwise indistinguishable) the apex of the elytra is slightly truncated and the apex of the suture is slightly produced (though less so than in *flavipennis*).

S. elegans, Géhin. This insect (referred to above as possibly identical with *flavipennis*, Géhin) is more probably, I think, a distinct species that I have not seen. I cannot understand its being called a variety of *Yarrelli* as no variety of the latter (observed by me,—and I have seen many) much resembles it in markings, and the size (12—13 mm.) greatly increases the difficulty of supposing it to be *Yarrelli*. Its author mentions having seen a good many specimens and the varieties he indicates are

still less than the type like *Yarrelli*. Its markings come nearer those of *S. bifasciata*, Saund., than of any other *Stigmodera* known to me, but it is certainly not that species.

EUCNEMIDÆ.

NEOLYCAON (gen. nov.)

I propose this name as a substitute for *Lycaon*, Bonvouloir (Ann. Soc. Ent. Fr., 1875), my attention having been called by Mr. T. S. Hall, M.A. (of Melbourne University) to its being a *nom. præocc.* in Zoology, owing to its use for *Mammalia* by Brookes (I see Scudder gives it "Smith") in 1827.

ELATERIDÆ.

LACON.

L. Victoriæ, Cand. In Pr. L.S., N.S.W., 1891, p. 508, I doubtfully attributed to this species an insect occurring near Melbourne, the doubt arising from its antennæ being testaceous or reddish in colour, whereas the description seemed to me to imply their being of darker colour. Subsequently Dr. Candéze sent me a specimen as his *Victoriæ*, which is identical with the insect I called by the name.

L. farinensis, sp. nov. Sat latus; sat opacus; piceo-ferrugineus, pronoti angulis posticis et elytrorum marginibus (sutura excepta) plus minusve rufescentibus; supra setis pallidis brevibus crassis sat crebre vestitus; capite pronotoque sat crebre sat fortiter punctulatis; hoc quam in medio longiori vix latiori, sat fortiter convexo (a latere viso), lateribus a basi sat longe ultra medium leviter subsinuatim divergentibus (hinc ad apicem fortiter convergentibus); elytris quam prothorax ut 9 ad 5 longioribus, subobsolete punctulato-striatis, interstitiis planis biseriatim (quam striæ haud magis subtiliter) punctulatis plus minusve distincte granulatis vel rugulosis,—epipleuris adversus abdominis basin recte truncatis; coxis posticis in medio subito fortiter angustatis; sulcis ad tarsos recipiendos in prosterno metasternoque sat fortiter impressis nec (ut *L. caliginosi*, Guer., sunt) bene definitis. Long., $2\frac{2}{3}$—$3\frac{1}{5}$ l.; lat., 1—$1\frac{1}{5}$ l.

A very distinct little species; the following characters in combination distinguish it from all its described Australian congeners:—Tarsal sulci on sterna very distinct but not sharply cut, front part of epipleuræ narrowed opposite the hindmargin by a straight truncation, hind coxæ suddenly and strongly narrowed about halfway between their base and the lateral margin of the body, elytra much longer than but less than twice as long as the prothorax, the punctures of the elytral striæ not larger

than those of the interstices, antennæ of pale-ferruginous colour, elytral margins pale-ferruginous and the interstices granulous or rugulose, upper surface set with short coarse pale setæ, size very small. The prothorax to a casual glance looks longer than wide but by measurement the length down the middle line is slightly less than the greatest width. The nearest allies of this species are, I think, *L. duplex*, Blackb., and *Victoriæ*, Cand., from both which it differs *inter alia* by its colour and the strong rugulosity of its elytral interstices.

S.A.; Lake Eyre basin; taken by Herr Koch at Lyndhurst, near Farina.

RHIPIDOCERIDÆ.

ENNOMETES.

E. (Callirrhipis) ruficornis, Gray. Some years ago I took, in the Blue Mountain district of N.S.W., a species which seems to be the very briefly described *Callirrhipis ruficornis*, Gray. It is however quite clearly a member of Pascoe's genus *Ennometes* (which seems to me worthy of being considered really distinct from *Callirrhipis*). I can find no character to distinguish as species *E. Lacordairei*, Pasc., and *C. ruficornis*, Gray, nor does the insect before me differ from either description except in being somewhat larger than the specimen described by Pascoe (Gray does not mention the size of his species). As Pascoe makes no reference to *C. ruficornis* it seems not unlikely that he overlooked it, and I suspect that *Callirrhipis ruficornis* and *Ennometes Lacordairei* are identical, in which case the insect must stand as *Ennometes ruficornis*, Gray.

RHIPIDOCERA.

R. mystacina, Fab. Mr. Waterhouse (Tr. E.S., Lond., 1875, p. 202) describes the typical specimen of this insect and mentions that examples from Northern Queensland are quite identical with it. He then mentions what he calls the "common form" which he says has the prothorax spotted (not evenly clothed) with white pubescence as being in his opinion a variety of *mystacina*. I have before me specimens of typical *mystacina* from N. Queensland and also examples with spotted prothorax from Tasmania, Victoria, and S. Australia. These do not appear to differ *inter se* except in the Tasmanian specimens being larger than those from the mainland. They are decidedly *R. femoralis*, Kirby (which was described from a small island close to Tasmania) and are certainly a good species differing from *mystacina* (apart from the vestiture of the prothorax) by *inter alia* the darker colour of their derm and the notable sinuation of the sides of their prothorax (the same in *mystacina* being nearly straight).

MALACODERMIDÆ.

TRICHALUS.

In Tr.R.S., S.A., 1894, I expressed the opinion that the genus *Trichalus* cannot be maintained as distinct from *Metriorrhynchus*. In Proc.L.S., N.S.W., 1898, Mr. Lea concurs with this view but seems to think that it is desirable to use the name as a matter of convenience because the distinction between the two forms is easily recognisable (the subsutural elytral costa in *Trichalus* becoming obsolete at a short distance behind the base, while in *Metriorrhynchus* it is similar to the other costæ). I think there is something to be said in favour of that proposition, as both forms are very numerous in Australia, and to treat them as generically distinct certainly simplifies the task of identifying and describing them. Accepting the name *Trichalus* on the above grounds, I offer the following notes.

T. (Metriorrhynchus) semicostatus, Blackb. *Trichalus* being regarded as a genus this species must be referred to it. *T. Raymondi*, Lea, must be somewhat close to it, and was taken in the same region (the Australian Alps). Probably however it is distinct, as *Raymondi* is said to have the median line of the head distinct, the antennæ of the male not reaching to the middle of the elytra and the rostrum tinged with red at the apex, whereas in *semicostatus* there is no distinct median line on the head, the antennæ of the male would certainly reach back to the middle of the elytra and the rostrum is entirely black. If the two names should prove to refer to the same insect my name has the priority.

T. funereus, sp. nov. Niger, elytrorum apice testaceo; rostro nullo; prothoracis areola discoidali lanceolata bene definita; elytris costis longitudinalibus discoidalibus integris 3 et alia subsuturali postice abbreviata instructis (his inter se æqualibus), interstitiis biseriatim areolatis (series lineis subtilibus continuis separantur); antennis quam corporis dimidium sat longioribus, sat compressis, articulo 4° quam 3us parum longiori. Long., $4\frac{1}{5}$ l.; lat., $1\frac{1}{2}$ l.

Its colouring (entirely black except the testaceous apex of the elytra) *inter alia* distinguishes this species from all its described Australian congeners. The only one of them in which the prothorax is black and the elytra not entirely red is *T. discoideus*, Er., of which Mr. Waterhouse mentions a form (in his opinion a variety) coloured like the present insect except in having the suture of the elytra red. The description of that species, however, calls the prothorax "antrorsum angustatus," which would not apply satisfactorily to this species as its prothorax is scarcely at all narrower in front than behind. Moreover I have a

Trichalus from Tasmania (Erickson's locality) which I believe to be *discoideus* and from which the present insect differs *inter alia* by the very much larger areolæ into which its elytral interstices are divided; they are like those of *Metriorrhynchus (Stadenus) inquinulus*, Waterh.

Victoria; Dividing Range.

T. distinctus, Lea. The description of this species scarcely differs from that of *T. ampliatus*, Waterh., and both descriptions might well be founded on the same insect as *Lycus ochraceus*, Dalm.

METRIORRHYNCHUS.

M. insignipennis, sp. nov. Mas. Totus niger; prothorace 7-areolato; rostro fere nullo; elytris costis longitudinalibus 4 instructis; hæ costæ costulis transversis numerosis bene definitis inter se junctæ sunt, ita ut in utroque elytro areolæ quadratæ longitudinaliter 5-seriatim positæ sunt; antennis corporis dimidio longitudine sat æqualibus, sat fortiter compressis, articulis omnibus (basali 2° que exceptis) quam latioribus plus minusve longioribus, articulo 3° 4° æquali. Long., $3\frac{3}{4}$—4 l.; lat., 1 l.

Although the rostrum is very short it cannot be called quite non-existent, the distance from the base of the antennæ to the base of the maxillary palpi being not much shorter than the length of one of the latter. The elytra have each four discal costæ without any trace of intermediate elevated longitudinal lines,—so that the sculpture of each elytron may be said to consist of five rows of well-defined areolæ separated from each other by longitudinal costæ of which the second is the most conspicuous. This sculpture is suggestive of Mr. Waterhouse's genus *Xylobanus* but the costulæ connecting the elytral costæ are not uniformly transverse; they resemble those of *M. scalaris* as figured by Waterhouse (Tr.E.S., Lond., 1877, Pl. I., fig. 56) and in any case *Xylobanus* does not appear to me capable of being maintained as more than a section of *Metriorrhynchus*. The second joint of the antennæ is scarcely visible.

Tasmania.

M. atratus, Fab. Fem. Totus niger; prothorace 7-areolato; rostro fere nullo; elytris costis longitudinalibus discoidalibus 4 instructis, interstitiis biseriatim indistincte areolatis (series lineis indistincte,—antice magis distincte,—elevatis separantur); antennis quam corporis dimidium sat brevioribus, sat fortiter compressis, articulis 3° 9° quam latioribus vix vel haud longioribus, 10° quam latiori multo longiori quam 9us multo angustiori. Long., $4\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

Very near *M. hæmorrhoidalis*, Er., of which I should be dis-

posed to consider it a colour var. with the elytral sculpture accidentally wanting in distinctness were it not for the very evident difference in the antennal structure,—the penultimate joint being very much narrower than the antepenultimate and not much less than half again as long as wide, while in the same sex of *hæmorrhoidalis* the penultimate joint is scarcely narrower than the antepenultimate and is scarcely if at all longer than wide. As *Lycus atratus*, Fab., is very insufficiently described and there cannot be much doubt of this Tasmanian *Metriorrhynchus* being identical with it I have thought it desirable to describe it fully.

Tasmania.

M. cliens, sp. nov. Fem. *M. clientulo*, Waterh., affinis; niger, in elytrorum partibus tribus anticis ruber; prothorace 5-areolato; rostro nullo; elytris costis longitudinalibus discoidalibus 4 instructis (his inter se sat æqualibus), interstitiis biseriatim areolatis (series lineis subtilibus elevatis separantur), sculptura basin—et præsertim apicem—versus quam in medio magis perspicua; antennis quam corporis dimidium vix longioribus, sat fortiter compressis, articulis 4°—9° quam longioribus sat latioribus, articulo 3° quam 4us sat longiori. Long., 4 l.; lat., $1\frac{1}{5}$ l.

Easily distinguishable from most of its congeners by the surface of its pronotum being divided into five areolæ, of which the two antero-lateral ones are coarsely punctulate. Differs from *M. clientulus*, Waterh., *inter alia* by the four principal elevated lines on the disc of its elytra being equal *inter se*, and the hind angles of its prothorax not produced outward.

N.S.W. (Tweed R.).

M. flagellatus, sp. nov. Mas. Niger, elytris rufo-testaceis; prothorace 7-areolato; rostro elongato (tibiæ anticæ longitudine sat æquali); elytris costis longitudinalibus discoidalibus 4 instructis (his inter se plus minusve æqualibus), interstitiis biseriatim perspicue et regulariter areolatis (series lineis subtilibus elevatis bene definitis separantur); antennis quam corporis dimidium vix longioribus, sat fortiter compressis, articulis 3°—10° longe flabellatis, flabellis haud serratis (ut ea *M. gigantis*, Blackb., sunt), articuli 3^i^ flabello ultra articuli 5^i^ basin producto. Long., 7 l.; lat., $1\frac{4}{5}$ l.

The long slender rami into which the antennal joints of the male are produced distinguish this species from all the other described Australian members of the genus (except *gigas*, Blackb.) having similar colouring (entirely black except the entirely red elytra). From *gigas* it differs by its narrower and more elongate form, the distinctly *testaceous* tone of colour on the elytra, the tendency of the elytral costæ to become feebler towards the apex, the narrower prothorax (especially in proportion to the width of

the head), and the non-serrate outline of the antennal rami. The antennæ resemble those of *M. cinctus*, Waterh.

N.S. Wales; taken by Mr. Froggatt near Yass. (His. No. 44.)

M. miles, sp. nov. Mas. Niger, elytris rufis; prothorace 7-areolato; rostro fere nullo; elytris costis longitudinalibus discoidalibus 4 instructis (his inter se sat æqualibus), interstitiis biseriatim areolatis (series lineis subtilibus distinctis, —his basin versus quam costæ vix minus elevatis,—separantur); antennis quam corporis dimidium brevioribus, fortiter compressis, articulis 3° leviter,—4°—10° valde transversis, 4° quam 3us paullo breviori. Long., 5 l.; lat., $1\frac{3}{5}$ l.

This species would be reckoned, I think, by Mr. Waterhouse a true *Metriorrhynchus*. It differs from all the species resembling it in respect of colour (except *rufipennis*, Fab., and *brevirostris*, Waterh.), by its having scarcely any rostrum. From *rufipennis* (=*salebrosus*, Waterh.) it differs *inter alia* by its still shorter and wider rostrum, by the much shorter and wider joints of its antennæ, by the obtuse hind angles of its prothorax, and by the much more distinct lines separating the interstitial areolets of its elytra which in the front might be called intermediate costæ. *M. brevirostris*, Waterh., has a diagnosis of only three words, and the appended note merely states that the insect differs faom *erythropterus*, Er., by "the rostrum shorter, scarcely longer than broad." In the present species the rostrum is very much broader than long.

Victoria; Dividing Range.

M. mentitor, sp. nov. Fem. Niger, prothoracis elytrorumque lateribus anguste, et horum apice sat late, rufis; rostro fere nullo; prothorace 7-areolato; elytris costis longitudinalibus discoidalibus 4 instructis (his inter se sat æqualibus), interstitiis biseriatim areolatis (series lineis subtilibus sat manifestis separantur); antennis quam corporis dimidium vix brevioribus, fortiter compressis, articulis 3°—10° quam longioribus vix latioribus, 3° 4° que longitudine sat æqualibus. Long., 6 l.; lat., 2 l.

Near *M. cœnosus*, Lea, but differing by the hind angles of the prothorax quite obtuse the lines separating the areolæ of the elytral interstices very distinct in almost their whole length (a little obscure only in the middle of their length) and the considerably larger size of the insect; also in the antennæ and legs entirely black. In colour (except in the red edging of its prothorax), general build, and elytral sculpture, remarkably like the insect that Mr. Waterhouse described as *M. inquinulus*, but subsequently (on the ground of its peculiar prothoracic areolation) placed in his genus *Stadenus*. According to Mr. Waterhouse's

arrangement of the Australian *Lycides* this is a true *Metriorrhynchus*.

Victoria; Dividing Range.

M. paradoxa, sp. nov. Mas. Niger, elytrorum apice sat late et margine externo (parte antica excepta) anguste rufis; pro thorace 7-areolato; rostro nullo; elytris costis longitudinalibus discoidalibus 4 (his inter se æqualibus) instructis, costis lineis recte transversis (his ut costæ æqualiter elevatis) conjunctis; antennis quam corporis dimidium paullo longioribus, sat fortiter compressis, articulis omnibus (2° excepto) quam latioribus longioribus, articulo 3° quam 1us duplo longiori, 3°—11° longitudine sat æqualibus modice serratis. Long., 4 l.; lat., $1\frac{2}{3}$ l.

The well defined seven areolæ of the prothorax together with the remarkable elytral sculpture render this species easy to recognise. It does not appear to fall into any of the subgenera that Mr. Waterhouse has formed at the expense of *Metriorrhynchus*. Each longitudinal costa on the elytra is connected with that next to it by a regular series of perfectly transverse short costæ of the same elevation as the longitudinal costæ, and there is no trace whatever of intermediate longitudinal lines. Mr. Waterhouse would perhaps place this insect in his genus *Xylobanus*.

Victoria; Dividing Range.

M. eremita, sp. nov. Mas. Niger, prothoracis lateribus margineque antico et elytrorum sutura (anguste) margine laterali (sat late) apiceque (vix in parte elytrorum septima) testaceo-rufis; rostro latiori quam longiori; prothorace 7-areolato; elytris costis longitudinalibus discoidalibus 4 (his fortiter cariniformibus inter se æqualibus) instructis, interstitiis biseriatim areolatis (quam *M. erythropteri*, Er., manifeste minus grosse, præsertim in parte mediana; series lineis subtilibus elevatis sat continue separantur); antennis quam corporis dimidium paullo longioribus, sat fortiter compressis, articulo 3° quam 4us vix longiori, articulis 3°—10° sat fortiter serratis, parte producta quam articuli pars cetera parum breviori.

Fem. antennis minus fortiter serratis. Long., 5—$6\frac{1}{2}$ l.; lat., $1\frac{2}{3}$—2 l.

Rather closely allied to *M. monticola*, Blackb., and *marginipennis*, Lea; from the former it differs *inter alia* by the much less coarse sculpture of the intervals between the elytral costæ; from the latter by *inter alia* the discoidal costæ of the elytra being similar *inter se* and the structure of the antennæ. There is evidently something wrong in the numbering of the joints in the description of the antennæ of *marginipennis* of which it is

stated that the "second joint is concealed and the third slightly longer than the second, second to tenth subequal, eleventh elongate." I suspect this means that the fourth is slightly longer than the third, but it certainly cannot mean that the third is if anything longer than the fourth, which is the case in the species before me. The colouring of this insect (quite constant in all the examples I have seen) also differs from that of the two species with which I am comparing it, the black discal patch on the elytra extending from the inner margin of the external elytral costa to the outer margin of the sutural carina, and leaving the apex red for the length of scarcely one-seventh part of the length of the elytra. The intermediate longitudinal elevated lines on the elytra are strongest near the base (where they are scarcely different from the costæ) and are distinctly traceable nearly to the apex. This insect might be suspected of being a variety of *M. lineatus*, Waterh., but *inter alia* its antennæ are incompatible, for in the male they resemble those of *inquinulum*, Waterh. (same sex), as figured by Mr. Waterhouse; while those of *lineatus* (male,—not figured by Waterhouse) are like Mr. Waterhouse's figure of the antennæ of *Trichalus flavopictus*, Waterh.

Victoria; Dividing Range.

M. rufipennis, Fab. I have little doubt that Mr. Waterhouse is right in thinking (though he is not very confident on the point) that his *salebrosum* is identical with Fabricius' species.

M. marginatus, Er. I should say there is no doubt that *M. hæmorrhoidalis*, Waterh., is identical with this species. I cannot however agree with Mr. Waterhouse (Typ. Br. Mus., Lyc.) that his *hæmorrhoidalis* may be a colour var. of *rufipennis*, Fab. The two are unquestionably closely allied apart from colour; but there is a very marked difference in the antennæ, the produced piece of each joint beginning with the sixth being in *rufipennis* very much more slender than in *hæmorrhoidalis* (=*marginatus*, Er.).

CALOCHROMUS.

C. cucullatus, sp. nov. Sat elongatus; modice convexus; sat nitidus (elytris exceptis); elytris pubescentibus; niger, elytrorum margine laterali et parte postica tertia læte rufis; labro antice emarginato; antennarum articulis 3° 4° que longitudine sat æqualibus; capite antice profunde sulcato; prothorace fortiter transverso, antice parum angustato, lateribus modice arcuatis, angulis anticis valde obtusis posticis (superne visis) fere rotundatis, disco medio profunde longitudinaliter sulcato, sulci lateribus valde gibbis (præsertim postice), disci parte postero-externa valde obtuse tumido, basi parum manifeste bisinuata; elytris costis

modicis discoidalibus 4 instructis, parte inter suturam costamque subsuturalem in dimidia parte antica sat distincte carinata, interstitiis subtilissime granulosis.

Maris clypeo antice profunde trifido, processu intermedio spiniformi suberecto; femoribus anticis incrassatis; segmento ventrali penultimo in medio emarginato.

Feminæ clypeo antice minus profunde trifido, processu intermedio nec spiniformi nec erecto; femoribus simplicibus; segmento ventrali penultimo haud emarginato. Long., $4\frac{1}{2}$—$5\frac{1}{2}$ l.; lat., $1\frac{3}{4}$—2 l.

Allied to *C. nodicollis*, Bourg., but differing from it, *inter alia*, by the markings of the elytra much more widely than my observation of a good many specimens of *Calochromus* allows me to think compatible with mere colour variety. The elytra of *C. nodicollis* are described as being entirely ochraceous except a narrow basal border, while in the present species their marking consists of a large common patch touching the base but not quite reaching to the lateral margins and extending hindward to the length of two-thirds of the elytra and slightly narrowing towards its apex, so that the red margin gradually widens slightly from its base and the apical one-third of the elytra is entirely red. Thus the black patch bears a rough resemblance to a hood thrown back over the elytra from their base. This marking seems constant. There are various details in which this insect departs otherwise from the description of *C. nodicollis; inter alia* the interstices of its elytral costæ are said to be rugose whereas in the present species they are excessively finely granulated,—scarcely more than coriaceous, and *nodicollis* is said "to a casual inspection to remarkably recall *C. scutellaris*, Er.," whereas the present insect is a much more robust species of considerably wider form with very much longer antennæ. The measurements of *C. nodicollis* make it fully three times as long as wide; *C. cucullatus* is distinctly less than three times as long as wide. Of the other previously described *Calochromi*, none seem to have the remarkable clypeal sexual characters of this species,—some have the prothorax bicolorous (very remarkably so in *C. brevicornis*, Lea, and *pilosicornis*, Lea, in which the prothorax is said to be "yellow tinged with red," and those having a black prothorax (even if the clypeal sexual characters have merely been overlooked in the descriptions,—as may be the case in one or two that I have not seen) present strongly marked differences that make this species very distinct.

Victoria; Dividing Range.

C. simillimus, sp. nov. Præcedenti (*C. cucullato*) affinis; differt elytrorum parte communi nigra antice angusta (ultra costam primam haud extensa) sat longe ante medium dilatata (sicut

hinc fere ad apicem costam tertiam fere attinet) ante apicem sat abrupte truncata, prothoracis basi sat fortiter bisinuata (sicut certo adspectu anguli postici nonnihil retrorsum directi videntur). Long., $5\frac{1}{2}$ l.; lat., $1\frac{4}{5}$ l.

Apart from the characters noted above the description of *C. cucullata* is an accurate description of this insect, and therefore need not be repeated. The markings of the elytra are identical in all the specimens that I have seen. The difference in the form of the base of the prothorax furnishes a satisfactory structural character.

S. Australia ; Adelaide District.

C. rostratus, sp. nov. Elongatus ; minus convexus ; minus nitidus ; supra pubescens ; niger, prothoracis lateribus et elytris totis aurantiaco-rufis ; capite minus porrecto, antice rostro manifesto (hoc quam longiori sat latiori) instructo, inter oculos longitudinaliter minus profunde canaliculato ; prothorace transversim subquadrato, longitudinaliter canaliculato (antice subtiliter, postice profunde), transversim carina obtusa (hac in medio minus perspicua) sinuatim antrorsum ex angulis posticis arcuata instructo, disco postice tuberculis obtusis 2 munitis, lateribus sinuatim subrectis, basi leviter bisinuata, angulis anticis fere nullis posticis fere rectis ; elytris striatis, interstitiis angustis leviter convexis (alternis quam cetera vix magis definitis) ; antennis quam corporis dimidium vix longioribus, modice compressis, articulis 3° 4° que longitudine sat æqualibus.

Maris segmento ventrali septimo profunde emarginato.

Feminæ segmento ventrali septimo profunde fere ad basin triangulariter impresso et ad apicem emarginato. Long., 4 l.; lat., $1\frac{2}{5}$ l. (vix).

The comparatively slight exsertion of the head in this species together with the presence of a distinct rostrum and the scarcely noticeable dilatation of the front femora in the male renders this species very distinct from any other Australian *Calochromus* known to me. All these characters, however, seem to be present in some of the species from other countries described in Mr. Waterhouse's monograph of the genus (Cist. Ent., II.), the essential character of *Calochromus* among the *Lycides* being there regarded as the "absence from the elytra of distinct carinæ separated by rows of punctures" together with the presence of seven ventral segments. In the species before me an excessively short basal ventral segment is certainly present in the male ; in the female I am not so sure of there being seven segments but probably there is an extremely short basal one which would be discernible if the hind body were broken off. The sculpture of the prothorax also differs from that of any other Australian

Calochromus that I have seen; a thick wheal-like edging commences at the posterior angles and proceeds a very short distance along the lateral margin and then curves inward and arches across the middle of the disc, being however narrowly interrupted on the middle line by the longitudinal median impression. There is an obtuse gibbosity on either side of the middle line immediately in front of the base and a somewhat deep excavation immediately within the hind angles. The prothorax is entirely margined with a thickened edging which however is not so thick as the wheal-like carina that crosses the disc.

S. Australia; taken by Mr. Jung on Yorke's Peninsula.

TENEBRIONIDÆ.

CHALCOPTERUS.

C. Kochi, sp. nov. Sat cylindricus; sat nitidus; niger, elytris metallico-versicoloribus (in disco cæruleis, latera versus aureo-viridescentibus, suturam versus purpurascentibus); capite crebre sat æqualiter punctulato, inter oculos quam antennarum articuli basalis longitudo fere angustiori; sulcis ocularibus nullis; antennis quam corporis dimidium sat brevioribus, articulo 3° quam 1us 2us que conjuncti manifeste longiori, quam 4us 5us que conjuncti manifeste breviori, articulis 8°—10° quam præcedentes multo brevioribus; prothorace quam longiori fere duplo (postice quam antice duplo) latiori, crebre subtiliter distincte sat æqualiter punctulato, lateribus (superne visis) pone medium fere parallelis, basi media sat anguste sublobata, angulis anticis obtusis; elytris æqualiter sat subtiliter (quam *C. Howitti*, Pasc., vix minus subtiliter) postice magis subtiliter seriatim punctulatis, interstitiis planis subtiliter (quam series permulto magis subtiliter) vix crebre punctulatis; prosterno sat distincte carinato; metasterno distincte punctulato et fortiter oblique rugato, episternis opacis leviter punctulatis; tarsis subtus nigro setosis, posticorum articulo basali quam 4us haud multo longiori; abdomine modice punctulato et longitudinaliter rugato. Long., 9½ l.; lat., 4⅔ l.

This extremely fine species is allied to *C. cupreus*, Fab., *brevipes*, Blackb., and *grandis*, Macl. From *cupreus* it differs *inter alia* by its entirely different colouration and (presuming my identification of that species to be correct) by its much more cylindrical form, very much more slender antennæ with quite differently proportioned joints and seriate punctures of elytra becoming much finer in the apical third; from *brevipes* it differs *inter alia* by its notably wider prothorax and much finer puncturation of the elytral interstices (so that the elytral series stand out much more conspicuously); and from *grandis inter alia* by

the much shorter basal joint of its hind tarsi. I am doubtful of the sex of the example before me (it is difficult to determine the sex of a *Chalcopterus* unless both sexes can be examined), but it is probably a female. In my tabulation of *Chalcopterus* (P.L.S., N.S.W., 1893) this species may be placed beside *cupreus*, Fab. (p. 60) though its prothorax is not quite "*fully*" twice as wide as long (but it is notably wider than in *brevipes*), from which it may be thus distinguished :—

J. Prothorax twice (or all but twice) as wide as long.
K. Seriate puncturation of elytra not enfeebled behind [*cupreus*, Fab.]
KK. Seriate puncturation of elytra becoming very feeble near apex ... ... *Kochi*, Blackb.

S. Australia ; Basin of Lake Eyre ; sent by Herr Max Koch.

C. gracilicornis, Blackb. (Tr. R.S., S.A., 1899, p. 45). The habitat of this species is N.W. Australia.

C. mundus, Blackb. (*l.c.*, p. 48). The habitat of this species is N. Queensland.

RHIPIDOPHORIDÆ.

EVANIOCERA.

E. persimilis, sp. nov. Mas. Picea, elytris rufescentibus; minus nitida ; confertim subtiliter punctulata ; cinereo-pubescens (lineatim in elytris); oculis modicis, subapproximatis (interspatio quam antennarum articuli basalis longitudo parum latiori separatis) ; antennarum articulis 1° compresso breviter piriformi, 2° parvo transverso, ceteris ramos elongatos singulos emittentibus, articuli 3ⁱ ramo quam ceterorum paullo breviori (a ramo articuli 4ⁱ vix longius quam ramus articuli 4ⁱ a ramo articuli 5ⁱ remoto); prothorace conico, basi bisinuata, lateribus (superne visis) vix sinuatis; elytris postice minus angustatis.

Feminæ antennarum articulis (basalibus 2 exceptis) sat fortiter serratis. Long., $2\frac{1}{2}$—$4\frac{3}{4}$ l.; lat., 1—$1\frac{4}{5}$ l.

Closely allied to *E. Meyricki*, Blackb., with similar elytral pattern (about six narrow vittæ of whitish pubescence on each elytron) and the same number (nine) of antennal rami ; differing from it in the ramus of the third joint being fully three-fourths of the length of the longest ramus (in *Meyricki* it is scarcely more than half) and scarcely more distant from the second ramus than the second ramus is from the third. It is moreover a more robust insect, less narrowed behind, with the prothorax less elongate and having posterior angles less strongly directed hindward. The other previously described species having nine antennal rami are *pruinosa*, Gerst., and *perthensis*, Blackb., neither of which has elytra marked with longitudinal pubescent vittæ ; moreover *pruinosa* has the first antennal ramus even shorter than that of *Meyricki*, a much more elongate prothorax,

&c.; while in *perthensis*, *inter alia*, the antennal rami are all less elongate and the antennal joints are shorter so that all the rami are notably more closely packed together than in the present my knowledge seen, the antennæ of which are not exactly species. The two species of the genus that I have not to described, are *Gerstäckeri*, Macl., and *Gerstäckeri* [Macl.?], Champ. which are so differently coloured that they are not at all likely to be identical with the present species. The rest of the described species have only eight antennal rami in the male. In my tabulation of the species of *Evaniocera* (Tr. Roy. Soc., S.A., 1899, p. 52) this species will stand beside *E. perthensis*, Blackb., from which it may be distinguished thus:—

C. Eyes divided ... ... *perthensis*, Blackb.
CC. Eyes normally emarginate ... ... *persimilis*, Blackb.

Victoria: in my collection; also in the collection of Mr. French.

E. perthensis, Blackb. When I described this species (*l.c.*, p. 53) I did not notice the remarkable character mentioned above In *E. nervosa*, *Meyricki*, &c., the eyes are very deeply emarginate, but the two lobes are connected perfectly distinctly; while in this species the two lobes are absolutely disconnected, so that the insect has four eyes,—a character which may perhaps have to be treated as generic eventually.

EMENADIA.

E. difficilis, Blackb. (Tr. R.S., S.A., 1899, p. 55). The habitat of this species is South Australia.

CURCULIONIDÆ.

BARIS.

B. orchivora, Blackb. Sat lata; minus nitida; glabra; picea (nonnullorum exemplorum elytris latera versus rufescentibus); rostro quam prothorax sublongiori, compresso, apicem versus nitido fortiter crebre punctulato et longitudinaliter strigato, scrobibus subtus conniventibus; oculis subtiliter granulatis; antennarum scapo oculum fere attingenti; prothorace confertim subgrosse punctulato; scutello modico granulato; elytris a basi retrorsum leviter angustatis, fortiter striatis, striis indistincte cancellatis, interstitiis crebre granulatis; femoribus sat elongatis vix clavatis, dente parvo armatis; tibiarum unco apicali parvo horizontali; unguiculis subparallelis, ad basin fere connatis. Long. (rostr. excl.), $1\frac{1}{3}$ l.; lat., $\frac{1}{3}$ l.

A very distinct species. It was bred in Sydney from the stems of a Queensland Orchid (*Dendrobium* sp.) and sent to me by Mr. W. W. Froggatt.

BRUCHIDÆ.

BRUCHUS.

B. lyndhurstensis, sp. nov. Rufo-castaneus, capite antennis apicem versus metasterno elytorum sutura maculisque nonnullis lateralibus et tarsorum apice obscurioribus; supra pube ochracea et albida indeterminate variegatus; subtus cum pygidio sat dense albido-pubescens; capite modice elongato minus lato (fere ut *B. rufimanus*, Schönh.) inter oculos longitudinaliter carinato; oculis subtiliter granulato (ut *B. rufimanus*); antennis sat brevibus sat robustis, articulis 5°—10° inter se sat æqualibus leviter transversis leviter serratis; prothorace conico, crebre subtiliter aspere punctulato; elytris subtiliter striatis, interstiis planis ut prothorax punctulatis; femoribus posticis inermibus.

Maris segmento basali ventrali fovea magna circulari (hac pube subtili flava in funda vestita) impresso. Long., 1 l.; lat., $\frac{2}{3}$ l.

Variat antennis minus obscuris, capite postice testaceo, elytris in sutura et ad latera magis late obscuris, pygidio nigro-maculato vel fere omnino nigro, femoribus posticis plus minusve obscuris.

A most variable species, if I am right in considering the specimens before me (which were taken by myself and others, in Central Australia in seeds of Cassia) as representing only a single species. The most distinctive character seems to be that on the basal ventral segment of the male, consisting in the presence of a large shallow circular impression placed anteriorly, and having a diameter equal to about two-thirds of the length of the segment on the median line. In some examples this impression is more sharply defined on the hind part of its outline than in others, and in some its floor is covered with fine yellow pubescence, which is wanting in others. I take these differences to be caused partly by abrasion and partly to be an instance of the variability in respect of development of sexual character so often found in species where such characters are of a very pronounced type. Only one species (*B. perpastus*, Lea) of *Bruchus* with unarmed hind femora has hitherto been described as Australian, and unfortunately the description of that insect does not refer to sexual characters—but its stating that the insect is black and of almost circular outline, with a triangular scutellum, seem to indicate clearly that it is not much like the present insect. In the species I am describing the scutellum is somewhat quadrangular, though appearing of different form according to degree of abrasion, position of prothorax, &c., but not definitely triangular in any specimen. In Mr. Lea's tabulation of *Bruchi* (Proc. L.S., N.S.W., 1898, pp. 637-8) the place of this species is beside *B. perpastus*, Lea.

Central Australia; Oodnadatta, Lyndhurst (Koch), Leigh's Creek, &c.

B. Oodnadattæ, sp. nov. Nigricans, antennis sordide testaceis apicem versus vix infuscatis, pedibus testaceis, femoribus (præsertim posticis) plus minusve nigricantibus, elytris ad apicem plus minusve distincte rufescentibus; supra pube nigricanti et albida indeterminate variegatus, subtus cum pygidio sat dense albido-pubescens; femoribus posticis ante apicem denticulo manifesto sed minuto armatis; cetera ut *B. lyndhurstensis*.

Maris segmento basali ventrali antice fovea parva ovali leviter impresso.

Differs from the preceding by its very different colouring, by the presence of an extremely small denticulation on the hind femora and by the very much smaller fovea (which is elongate oval, not circular) on the basal ventral segment of the male. In some examples the elytra are only vaguely reddish at the apex, in others there is an extremely well defined bright red apical spot. In Mr. Lea's tabulation of *Bruchi* (*loc. cit.*) the place of this species is beside *diversipes*, Lea, from which it differs *inter alia* by the minute size of the tooth on its hind femora.

Central Australia.

B. diversipes, Lea. I have an example of this species courteously sent me by Mr. Lea, and also numerous specimens of the larger insect from W. Australia, which he dubiously identifies with it. I doubt the identity of the two, although I cannot find any good structural character to distinguish them. Unfortunately my specimen of typical *diversipes* is a female. The basal ventral segment of the male of the larger insect is without any sexual fovea. Perhaps an examination of a male *diversipes* from N.S. Wales might show a valid distinction on the basal ventral segment.

B. quornensis, sp. nov. Niger, antennarum articulis basalibus 4, elytrorum disco apiceque et pedibus (femorum basi et tarsorum apice exceptis) rufo-testaceis; supra pube albida et testacea vel rufa variegatus; subtus cum pygidio minus dense albido-pubescens; capite modice elongato, inter oculos longitudinaliter carinato; oculis sat subtiliter granulatis; antennis sat elongatis, articulis 5°—10° robustis leviter serratis; prothorace transversim trapezoidali, antice minus fortiter angustato, crebre subtiliter ruguloso, elytris subtiliter punctulato-striatis, interstitiis planis fere ut prothorax asperis sed paullo magis subtiliter; femoribus posticis dente parvo acuto armatis.

Maris segmento basali ventrali nullo modo foveolato. Long., 1 l.; lat., $\frac{2}{3}$ l.

Variable in the colouring of the elytra. The base, suture and lateral margins are broadly piceous or black, but in some examples somewhat mottled with whitish or castaneous pubescence; the rest of the surface (a broad discal patch not reaching the base) is of lighter colour and is variegated with whitish and slightly reddish pubescence not differing much in colour, but each shade running longitudinally so as to give a faintly striped appearance; abraded examples have black elytra with a wide reddish discal vitta not reaching the base. The antennæ have their fifth and following joints much wider in comparison with the fourth joint than in the species described above, causing the antennæ to appear as consisting of a stem of four joints and a long serrate club of seven joints (the first three joints of which gradually increase in size). The tooth on the hind femora is much larger than that of *B. Oodnadattæ* but a little smaller than that of *B. diversipes* and does not seem to vary in development. In Mr. Lea's tabulation of *Bruchi* this species stands beside *B. despicatus*, Lea, from which it differs *inter alia* by the basal four (not three) joints of its antennæ testaceous and their series of serrate joints beginning with the fifth (not the fourth).

S. Australia; Quorn.

B. fabæ, Fab. I presume that the insect which Mr. Tryon reported (Tr. Nat. Hist. Soc., Brisbane, vol. I.) as *B. obtectus*, Say, is this species. Mr. Tryon does not say why he prefers Say's name; it is to be noted however that it is later than that of Fabricius.

B. pisi, Linn. In a note to his remarks on *Bruchus* (*loc. cit.*) Mr. Lea quotes Mr. Tryon as having reported a species from Queensland as "*B. pyri.*" Mr. Tryon, however, has no such name, but mentions "*B. pisorum.*" I presume both names are intended for *B. pisi*, Linn.,—indeed in the body of his paper Mr. Lea mentions *B. pisi* (without an author's name) apparently as the same species which in the note he calls *pyri.*

B. persimulans, sp. nov. Niger, antennis (his nonnullorum exemplorum articulos 6°—10° plus minusve infuscatos præbentibus), pedibusque (horum femoribus posticis basin versus et tarsorum articulo ultimo obscuris) testaceis, elytris rufis nigro-cinctis (apice rufo excepto); sat æqualiter cinereo-pubescens; antennarum articulis 4°—10° sat robustis leviter serratis; elytrorum interstitiis quam prothorax multo magis subtiliter sculpturatis, vix asperis; cetera ut *B. quornensis.*

Maris segmento basali ventrali nullo modo foveolato. Long., $1\frac{2}{5}$ l.; lat., $\frac{4}{5}$ l., vix.

Except in respect of the characters mentioned above, the description of *B quornensis* applies to this species also. The

colouring of the derm in the two insects is very similar, but the pubescence of the elytra differs considerably, a fresh specimen of *quornensis* having a very mottled appearance while a fresh specimen of *persimulans* has an even vestiture of whitish pubescence. The present insect is considerably larger than *quornensis* and has very different antennæ, there being much less difference in size between the fourth and fifth joints and the fifth and sixth joints being *inter se* equally dilated, while in *quornensis* the fifth joint is notably less dilated than the sixth. *B. persimulans* also has a good deal of colour resemblance to partially abraded examples of some varieties of *B. lyndhurstensis*, but is readily distinguished from it by its longer antennæ, black prothorax, as well as by the presence of a tooth on the hind femora and the absence of sexual characters on the basal ventral segment. This species does not fit into any of the groups in Mr. Lea's tabulation, not having its prothorax and elytra either both red or both black.

Central Australia; Oodnadatta.

PHYTOPHAGA.

MEGASCELOIDES.

M. circumcinctus, sp. nov. Fem. Minus elongatus; pubescens; piceus, antennarum basi capite prothorace antice elytris (marginibus totis anguste piceis exceptis) pedibusque rufis; capite brevi lato sat fortiter punctulato; antennis filiformibus quam corporis dimidium sublongioribus; prothorace quam longiori plus quam sesquilatiori, subquadrato, convexo, subtiliter inæqualiter punctulato, marginibus omnibus sat rectis, angulis anticis subdentiformibus posticis obtusis; elytris sat crebre minus subtiliter punctulatis, lineis vix elevatis longitudinalibus circiter 3 instructis; femoribus leviter incrassatis. Long., $3\frac{3}{5}$ l.; lat., $1\frac{2}{5}$ l. (vix).

The insect described above has been in my collection for some considerable time placed doubtfully as belonging to the *Megascelides*. Mr. French has recently sent me an insect closely allied to it which being a male I can identify confidently with Mr. Jacoby's genus *Megasceloides* (it is probably the typical species); and by comparing my species with it I have satisfied myself that the former is a female of the same genus. It differs from the male in what are likely to be sexual characters by the intermediate joints of its antennæ scarcely dilated and its less strongly dilated femora. Specifically it differs from *M. pallidus* by its colouring (the prothorax piceous with its anterior one-third testaceous and the elytra narrowly and abruptly edged all round with piceous black), by its notably more transverse prothorax, the front angles of which are dentiform, and by the less numerous elevated lines on its elytra.

W. Australia.

EDUSA.

The following species while certainly, I think, a member of the group *Edusites*, differs from typical members of the genus *Edusa* by its unusually narrow parallel form and its entirely glabrous upper surface. Five *Edusoid* genera have been recorded as Australian, viz., *Edusa*, *Edusoides*, *Cleptor*, *Thaumastomerus* and *Ocnida*. The insect before me certainly cannot be attributed to the second or third of those genera,—but the last two do not appear to me to have been satisfactorily differentiated from *Edusa*. *Thaumastomerus* was unknown to Dr. Chapuis (as it is to me) and he conjectured that it ought not to be separated from *Edusa*. Of *Ocnida* he says that its diagnosis does not contain any tangible character for identification,—in which opinion I agree with him. The following species is not any of those that have been attributed to those genera, and so far as I can make anything of the generic diagnoses it does not agree with them, nor can I find any marked structural character inconsistent with its place in *Edusa* which (as Dr. Chapius conceived it) included forms widely differing in superficial characters.

E. angustula, sp. nov. Sat angusta, sat parallela; supra glabra; subtus pilis erectis brevibus gracilibus sparsim vestita; metallico-versicolora (viridis, aureo cupreoque varie micans), antennis (his apicem versus infuscatis) palpis labro pedibusque testaceis; capite verticali, sparsius subtilius punctulato; antennis filiformibus apicem versus parum incrassatis, quam corporis dimidium parum longioribus; prothorace leviter transverso, ut caput (latera versus magis crebre) punctulato, antice modice angustato, lateribus arcuatis, angulis anticis obtusis nullo modo productis, posticis obtusis (his, in prosterno visis, dentiformibus); elytris crebre punctulatis, apicem versus nonnihil punctulato-striatis, totis fortiter rugatis; femoribus (sexus observati) haud dentatis sed subtus late subangulatim dilatatis. Long., 2 l.; lat., $\frac{1}{3}$ l.

In my tabulation of the species of *Edusa* (Tr. R.S., S.A., 1891, pp. 142-3) this insect falls beside *glabra* (at the end of the table) from which it may be thus distinguished :—

C. Form widely oval ... ... *glabra*, Blackb.
CC. Form narrowly parallel ... ... *angustula*, Blackb.

I have seen four examples of this species, among which I find no conspicuous sexual differences. Probably they are all females. W.A.; sent by Mr. French.

RUPILIA.

R. angulaticollis, sp. nov. Ovata; minus nitida; supra obscure cœrulescens, capite antice antennis (apice excepto) prothoracis marginibus omnibus scutelloque plus minusve

distincte rutescentibus; subtus obscure rufa, abdomine obscure cæruleo viridimicanti, pedibus piceis plus minusve rufescentibus; capite inter antennas longitudinaliter excavato minus perspicue punctulato, postice planato sparsim sat grosse vix fortiter punctulato; antennis robustis minus elongatis, articulis 1° 3° 4° que longitudine inter se sat æqualibus; prothorace quam longiori duplo latiori, crebre aspere vix rugulose punctulato, margine antico quam basalis vix angustiori (ambobus sensim elevatis), lateribus ante medium fortiter angulatis (hinc antrorsum et retrorsum convergentibus); elytris parum dehiscentibus, haud longitudinaliter impressis, crebre minus subtiliter subaspere nec rugulose punctulatis; scutello lato, fere ut elytra punctulato.

Maris elytris ultra segmentum ventrale penultimum attingentibus minus latis; feminæ segmenti penultimi medium vix attingentibus sat latis. Long., 3—3½ l.; lat., 1⅔ l.—2 l.

Differs from *R. ruficollis*, Clk., *inter alia*, by its much more strongly transverse prothorax and its much longer elytra. *R. viridi-ænea*, Clk., is not described in a manner to allow of very satisfactory comparison, but the present species is very differently coloured, and the phrase "*capite inter oculos transverse foveolato*" does not describe at all correctly the sculpture of the head of the present species. In *R. impressa*, Blackb., and *brevipennis*, Blackb., *inter alia multa*, the prothorax is very much more nitid and less conspicuously punctulate. *R. rugulosa*, Blackb., has very much more rugulose sculpture, and *R. excelsa*, Blackb., besides being very differently coloured has *inter alia*, a less transverse prothorax (its width to its length down the middle as 8 to 5) which is traversed by a very strong and conspicuous transverse sulcus.

N. Queensland.

R. approximans, sp. nov. Ovata; modice nitida; obscure rufescens, elytris obscure cyaneis violaceo-tinctis; capite sparsissime punctulato, linea longitudinali subtili impresso, hac ut fovea elongata profunda inter antennas dilatata; antennis elongatis, articulo 3° quam ceteri sat longiori; prothorace quam longiori sesquilatiori, longitudinaliter late canaliculato, subfortiter minus crebre (ad latera sat crebre), punctulato, latitudine majori antice sita, margine antico late elevato-crassato, lateribus (desuper visis) ab apice ultra medium leviter subrecte (hinc ad basin valde fortiter) convergentibus; elytris modice dehiscentibus, a basi retrorsum breviter minus perspicue impressis, confertim subtilius punctulatis; scutello modico.

Maris antennis ultra elytra media attingentibus; elytris segmentum ventrale penultimum medium attingentibus.

Feminæ antennis elytrisque nonnihil brevioribus.

Var. elytris antice suturam versus rufescentibus. Long., $4\frac{1}{2}$—$5\frac{1}{2}$ l.; lat., 2—$2\frac{2}{3}$ l.

Differs from the description and figure of *R. ruficollis*, Clk., and *brevipennis*, Blackb., *inter alia*, by its much longer and more ample elytra, from *R. viridiænea*, Clk., by the same characters as *angulaticollis* differs by, from *rugulosa*, Blackb., by its non rugulose sculpture, from *angulaticollis* by its very different antennæ, and from *excelsa*, Blackb., by the sculpture of its prothorax. It is near *R. impressa*, Blackb., but differs from it by the strongly and widely thickened front margin of its prothorax, the much closer and more distinct puncturation of that segment, &c. In *R. impressa* there is a transverse ill-defined gibbosity on the prothorax, but it is situated distinctly behind the front margin.

N. Queensland.

MONOLEPTA.

M. cognata, Blackb. This insect,—described from N. Queensland,—has been sent to me by Mr. French as taken in W. Australia.

COCCINELLIDÆ.

LIPERNES.

This name (which I used for a *Coccinellid* genus, Tr. R.S., S.A., 1888, p. 211) I find had been previously used by Mr. Waterhouse for a genus of *Lycides*. I therefore propose as a substitute for my name *Notolipernes*.

Sulvanite: a New Mineral.

By G. A. Goyder.

[Read June 5, 1900.]

Some specimens were sent to the Assay Department of the Adelaide School of Mines and Industries for assay for copper by Mr. E. Meylan, of Port Pirie, who stated that they were obtained from a new mine near the Burra.

During the analysis for copper I found that they contained vanadium, and therefore wrote for further samples, which Mr. Meylan promptly sent.

On examination these proved to consist of malachite, azurite, vanadium ochre, quartz, calcite, gypsum, and a metallic mineral, consisting principally of copper, sulphur, and vanadium.

A small piece of this mineral, as free as possible from associated minerals, was powdered and digested with acetic acid (which removed some malachite and calcite), washed, dried, and analysed. There was not sufficient for an accurate analysis in detail, but the following figures were obtained:—

Per cent.	Per cent.	Per cent.
Copper, 58·82	Vanadium, 11·88	Sulphur, 26·44

the balance being silica, lime, and a trace of iron.

The ratio of copper to vanadium was confirmed by a duplicate analysis of a smaller sample by a different method of analysis.

The mineral was found to contain no sulphur in the form of sulphate, and on heating in a closed tube it gave off no sulphur, from which it would appear that the copper must be in the form of Cu_2S, with the vanadium as V_2S_3. The ratio of Cu_2S to V_2S_3 in the sample analysed is $3\frac{1}{2}$ to 1, but an analysis of some other specimens not so pure proved them to contain an oxidized vanadium mineral with a smaller relative proportion of copper, so that the composition of the mineral is most probably $4Cu_2S$, V_2S_3, which constitutes it a basic sulpho-vanadite of copper.*

The samples sent me were all in a more or less oxidized form, and as the mineral is not distinctly crystalline, and is penetrated by oxidised products almost throughout, its physical properties cannot be accurately ascertained.

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* Subsequent analyses show that the mineral is a sulpho-vanadate of copper, $3Cu_2S$, V_2S_5.

The lustre appears sub-metallic, and the colour bronze, the specific gravity over 4, and the hardness 3·5.

As far as I can ascertain from the publications to hand, there is no record of any unoxidized vanadium mineral.

Mr. Meylan has promised to send me some further samples, and should the mine be worked deep enough, some of the pure unoxidised mineral may yet come to hand, in which case further analyses will be made and the physical properties more accurately ascertained.

Evidences of Extinct Glacial Action in Southern Yorke's Peninsula.

By Walter Howchin, F.G.S.

[Read June 5, 1900.]

Glacial deposits have already been described in the Transactions of this Society as occurring on the eastern and southern shores of Gulf St. Vincent, and in most cases such deposits extend seawards and pass from view below low-water mark. It may, therefore, be inferred that the southern portion of the present gulf occupies an eroded hollow or depression in what was formerly an extended area of glacial till. On this assumption it seemed highly probable that the southern portions of Yorke's Peninsula would be included in the extinct glacial field. This supposition has been amply confirmed by discoveries made during Easter week of the present year. The southern portions of the Peninsula have a lateral extension, shaped like a human foot; the northern and southern coasts of this area were visited, and very instructive sections of the glacial beds were observed, whilst many localities inland furnished confirmatory evidences of the previous existence of ice on a large scale.

Southern Coast.

Troubridge Hill.—The first locality visited was Troubridge Hill, about ten miles from Edithburg, in a south-west direction, viâ Honiton. The sea-cliffs near the Hill are composed of calciferous sandstones capped by travertine limestone. The sea breaks at the base of the cliffs, which are being rapidly undermined. At a distance of about half a mile to the west from Troubridge Hill the base of the Eocene beds is exposed, and the latter are seen to rest on an eroded surface of glacial till. The Eocene beds are here reduced in thickness to a layer of three feet, consisting of loosely held comminuted fragments of polyzoa, with countless numbers of the small echinoderm, *Fibularia gregata*. The occurrence of this echinoid in the bed referred to fully justifies its specific name, as it is mostly aggregated in clusters, varying in size up to a foot in diameter.

The following is a section of the cliffs as seen at this spot:—

1. *Recent*—Travertine limestone ... ... 10 feet
2. *Eocene*—Fossiliferous (*Fibularia gregata*) limestone 3 "
3. *Pre-Tertiary*—Glacial till with erratics; thickness unknown; height exposed above sea level ... 8 "

The till has the character of a red clay with bluish streaks, and rises suddenly in the cliff face in the form of one or two nodular inliers, around and over which the sediments of the Eocene sea has gathered. The clay carries erratics to a limited extent, but numerous stones of this character, liberated by the waste of the cliffs, lie at their base and along the beach.

About a mile further to the westward the glacial clay is again seen in a much more important exposure, extending in a line of cliffs for about a mile in an east and west direction. The cliff face has a maximum height of about 50 feet, and the thickness and character of the strata vary within the distances of a few yards in a very remarkable manner. The following two sections can be seen on the same horizon within a distance of less than one hundred yards:—

EASTERN SECTION.

1. *Recent*—	Travertine limestone	20 feet
2. *Pre-Tertiary (Glacial)*—	Dark-coloured clay	10 "
	White and pink-coloured argillaceous sands, base not exposed; thickness above sea level	20 "

WESTERN SECTION.

1. *Recent*—	Travertine limestone	3 "
	Calcareous sand rock, (?) raised beach	8 "
	Travertine limestone	6 "
2. *Pre-Tertiary (Glacial)*—	Dark to reddish clay	6 "
	White kaolinised clay with red patches, angular grit and erratics; thickness above sea level	27 "

In the second of the above cliff sections there is what may be a raised beach deposit intercolated between two beds of travertine. It is composed, to the extent of three-fourths of its mass, of water-worn calcareous sand, and the remainder of fine quartz sand. The bed does not exhibit false bedding, as it would probably have done had it been wind blown, and, in weathering, it splits up by vertical jointing which gives it an appearance of a decomposed basaltic rock. If it be a raised beach, the lower bed of travertine in the section represents an old land surface that was (subsequent to its formation) submerged below high-water mark, and, at a later period, was raised again and received its second deposit of travertine limestone.

The white kaolinised glacial clay of this section is a remarkable bed, and has a peculiar chalk-like appearance as seen in the cliff face, but the presence of undoubted erratics scattered promiscuously through its mass, places its origin

beyond question. The erratics of the coast show that the ice must have passed over a granitic country in which the felspathic constituents of the rock greatly preponderated, and the kaolinised features of the clay on some parts of this coast may be caused by the waste produced by such a felspathic bed rock.

The beach in front of this line of outcrop is strewn with erratics of all sizes—quartzites and granites being in greatest numbers. One of these, a large tabular mass of coarse-grained, pink-colored, porphyritic granite, lying between tide marks, measured fully twenty feet in diameter.

The Eocene beds are absent from this section.

Port Moorowie is situated on the southern coast about ten miles south-west of Yorketown, and about six miles west of the glacial beds near Troubridge Hill, already described. A good exposure of boulder clay, carrying numerous erratics, extends for about a mile near the jetty, chiefly on its eastern side. The beds as seen in section in the cliffs make a low anticline with a maximum height of about 36 ft., exhibiting the following order:—

1. *Recent*—Travertine and calcareous marls		15 feet
2. *Pre-Tertiary (Glacial)*—	Reddish clay, with pipeclay bands ...	10 "
	White to bluish clay, with dark-red patches and streaks, carrying erratics; thickness exposed above sea level ...	11 "

The boulder clay of this section shows a general resemblance to the beds of the same age observed on the coast further to the east, and which have already been described. In the westerly outcrops of the Troubridge Hill beds (as also at Port Moorowie), the upper part of the clay, varying from six to ten feet in thickness, is apparently marked off from the underlying clay by a bedding plane. I saw no stones in this upper layer, the absence of which may raise some doubt as to its glacial origin, although such negative evidence cannot be taken as conclusive, as considerable bodies of undoubted glacial clay sometimes occur in South Australia in which no erratics are visible. I have included the layer in question provisionally in the glacial series, but further observations may show that it consists of re-arranged material from the underlying till bed, and belongs to a later period.

Erratics of small to moderate size are common on the beach at Port Moorowie. At one mile east from the jetty a boulder of grey granite, with large crystals of orthoclase giving it a porphyritic character, was observed, and measured at seven feet by four feet.

Northern Coast.

Point Turton.—An interesting geological section was found at Point Turton, situated on the shores of Hardwicke Bay, about six miles in a north-westerley direction from Warooka. The cliffs present a good face of rock as the Eocene limestone, of which the cliffs are chiefly composed, have been quarried for flux. The section that is exposed near the jetty is a very remarkable one, as it embraces no less than four distinct geological formations separated by three lines of unconformability.

The following is the order of occurrence:—

1. *Recent*—	Travertine limestone, variable in thickness up to	20 feet
2. *Miocene*—	Reddish, mottled clay, preserved in eroded hollows of lower Tertiary limestone; thickness *nil* to... ...	20 "
3. *Eocene*—	Pink-coloured fossiliferous limestone; variable in thickness up to	35 "
4. *Pre-Tertiary (Glacial)*—	Boulder clay, with glaciated erratics; thickness unknown; exposed above low water	15 "

The Miocene clay is best seen at a spot about a hundred yards west of the jetty, and has been preserved from denudation through occupying an eroded trench in the Eocene limestone, the latter having been nearly cut through by the eroding agents.

The Eocene limestone of the section is, as a whole, an extremely compact and pure carbonate of lime. It has been subjected to considerable alteration and reconstruction *in situ*, a secondary deposit of calcium carbonate having been precipitated within the interstices of the fossiliferous bed imparting to it a greater compactness. In some places most beautiful slabs of polyzoal stone, with the fronds weathered into strong relief, can be seen. The great purity of the stone makes it valuable as a fluxing agent.

The Eocene beds rest unconformably on the eroded surface of the glacial clay, the line of junction being very sharp.

The boulder clay is exposed for some distance in a variable thickness up to fifteen feet, and passes below sea level. The varying thickness of the bed is evidently the result of subærial waste that took place in pre-Tertiary times, before the old land surface was submerged by the Eocene sea. The clay is very compact, except where it is subjected to wave action below high-water mark, and even in that position it maintains a good hard floor that can be walked over without discomfort.

Immediately under the Tertiary limestone the clay is much impregnated with dendritic manganese, and the upper portion of the bed, notably the first three feet, is largely iron-stained. Many of the included boulders have formed a centre of segregation for the peroxide of iron, being thickly coated with this substance, giving them an appearance of nodular ironstone. When broken, however, the unaltered stone is seen to occur below the ferruginous crust. Beneath this iron-stained layer the clay is dark-colored in shades of bluish-black. When seen in plan on the beach (horizontal to the bedding), an extensive system of jointing can be recognised, the joint planes crossing each other at various angles.

The erratics contained in the clay are for the most part strongly striated or polished by ice action. The shingle of the beach consists mainly of erratics that have been liberated from the boulder clay through wave action on the cliffs. A large granite boulder occupies a position between tide marks, and measures three feet six inches in height.

Inland Localities.

(*a*) *Warooka.*—The township of Warooka stands on a hill of boulder clay that has been eroded on three sides. On the north side of the township in Section 200 (Hundred of Moorowie), a dam has been excavated in this clay. About a dozen small erratics—chiefly quartzite and granite—were counted within a short distance of the excavation. The outcrop becomes more characteristic as it is followed around the eastern and southern sides of the ridge, in Section No. 201. Near the extremity of the eastern spur a granite boulder, two feet in diameter, lies in the paddock. There are also about a dozen smaller fragments of granite lying around, which have probably been broken from the larger mass. The stone is coarse-grained with large crystals of orthoclase, in bunches and veins, resembling the granitic outcrops at Corney Point. On the south side of the ridge is another erratic of pink-colored granite, carrying black mica, about the same size as the one just described; and not far distant from the last-mentioned a third erratic was found, being a close-grained bluish quartzite, with polished face, and heavily scratched.

The outcrop of boulder clay was followed across the road dividing the Hundreds of Moorowie and Para Wurlie, and more granites were picked up in Section No. 23 of the latter Hundred.

A few small weathered pieces of Eocene limestone were seen on the north flanks of Warooka Hill, but whether such are the remains of a small outlier of rocks of this age in the

neighborhood, or were carried there, I am unable to say. To all appearance the only deposit superior to the glacial clay in the neighborhood is a thin crust of travertine limestone which lies directly on the boulder clay.

(*b*) *Corney Point Road.*—A large erratic occurs near the main road from Warooka to Corney Point. It is situated on the north side within about twenty yards of the road in Section No. 148, Hundred of Carribie, about two miles east of the Dairy Station, and seven miles from Corney Point. Its large size and isolated character has attracted general attention in the district, and has been recorded on the Government Map as the "Granite Rock." It measures above ground 7 ft. x 5 ft., but to all appearance its actual size is much greater. It is not a "granite rock" but a greyish-colored, granular, hornblendic schist, having a close resemblance to some of the highly metamorphic rocks on the coast at Corney Point. From the effects of weathering it has split into several pieces—the measurements given are intended to include the block as a whole. The occurrence of this transported stone in the position described, is interesting, as it marks the most westerly point that I was able to note the presence of glacial deposits.

(*c*) *Lake Fowler.*—This is the largest of the numerous salt lagoons that are scattered over the southern portions of Yorke's Peninsula. It is situated about four miles south of Yorketown, and is more than ten miles in circumference. The Lake occupies a depression in the boulder clay, proof of which can be seen at various points both on the lake bottom as well as in the cliffs that surround its margin. The most interesting assemblage of glacial features met with in my visit was on the north side of the Lake, in Section No. 178 (Hundred of Melville) at a spot that can be reached by a path from the road, through a slip panel, and across a field. Near where the path strikes the lake the sloping bank contains a group of twelve large pieces of pink-colored granite, having but a slight elevation above the ordinary level. The group measures ten feet by six feet, and was probably only one piece orginally, but has split along joint planes as the result of weathering.

About eighty yards to the westward of this erratic, other two huge granite blocks can be seen standing in the mud of the lake about a dozen yards away from the base of the cliff. On examination it was evident that the two fragments had been originally one block, the vertical fissure having probably occurred after it had become stranded in its present position. Conjointly they measure six feet six inches high and eight feet wide. Lying around this great erratic are

some half dozen other granite boulders varying in size up to several feet in diameter.

A short distance further to the westward can be seen two enormous masses of close grained bluish quartzites lying endways to the base of the cliffs. The first of these measures thirteen feet six inches by five feet six inches; and the second, which is separated from its companion by only a few feet, is almost as large. Similar boulders of a smaller size are strewn in the vicinity. It must have been ice of great transporting power that could carry stones of such a size as described.

The cliffs of the Lake near these erratics are about twenty feet in height, and consist intermittently of clay and sand rock. The change from the one feature to the other is often very abrupt. The clay is generally very compact, grey in color, with red patches; whilst the sand-rock may be colored white, yellow, or a deep brick-red. The stratigraphical lines are often very bewildering. In places no bedding planes can be detected, and in others they rapidly alter from the horizontal to nearly vertical direction, accompanied with contortions.

(*d*) *Maukowurlie Lagoon.*—This is a long narrow lagoon running parallel with the road between Yorketown and Port Moorowie. The widest portion of the lagoon is at its southern end, and on the eastern side of this larger basin in the lake two granite boulders are conspicuous. They are visible from the public road at a distance of about a quarter of a mile.

(*e*) *Moorowie Head Station.*—Situated about ten miles north-west of Yorketown on the edge of the Great Swamp country. I am indebted to Mr. Matthews, of Yorketown, and to Mr. Fowler, of Yararoo, for calling my attention to two erratics of granite which occur near this Station. I was unable to visit the locality, but the independent description given by the gentlemen named agree in every particular. One of the stones referred to measures three feet by eighteen inches, and lies on the east side of the main road in Section No. 38, Hundred of Moorowie. Mr. Fowler describes it as "red granite similar to the granite seen in the cliffs at Cape Spencer." The second of these boulders is described as much larger than the one just referred to, estimated at five feet by three feet, lying on the north side of a small lagoon in Section No. 37, about three-quarters of a mile from the first mentioned.

(*f*) *Lagoon at Pentonvale Head Station.*—Mr. Matthews, of Yorketown, has a granite boulder in his yard that had been brought from the above lagoon as an object of interest. The

locality is about three miles north-east of Yorketown. The stone is not so coarse in the grain as many of the erratics of the district, and was probably derived from a grey colored granite, as the evidence of this still remains, although the block, as a whole, is now of a deep red color from penetrating iron stains. The mica constituent is Biotite.

(*g*) *Well-Sinking at Yorketown.*—Sinking for water has been extensively tried throughout the district with varying success. All such sinkings have been in stiff clay, and I have learnt by enquiries that the occurrence of isolated stones in the clay is a common thing. Mr. Matthews, of Yorketown, has kindly placed in my hands a fragment of a granite boulder that was met with in sinking a well at Yorketown. It was found at a depth of 60 ft. from the surface, and has a distinctly polished face on one side. In no instance, so far as I could ascertain, was the clay bed penetrated to the bed rock in these sinkings.

(*h*) *Government Bore in Tocchi's Lagoon.*—In 1890 the Government put down a trial bore at the northern end of Tocchi's Lagoon, situated in Section No. 291, Hundred of Melville, about a mile east of Yorketown. Through the courtesy of Mr. J. W. Jones, Conservator of Water, I am enabled to give the following particulars of the strata passed through in the bore:—

	ft.	in.
Black mud	2	0
Dark clay with gypsum	28	0
Dark clay	270	0
Hard sandstone	3	0
Sandy clay	1	6
Very hard blue rock	0	11
Bore stopped at	305	5

The above sinking was evidently in the boulder clay of the district, and shows a local development of, at least, something over 300 ft. Work was stopped on meeting a hard rock, which was penetrated to the extent of eleven inches. The occurrence of a hard rock in such a formation could not be taken as definite proof that the base of the clay bed had been reached. It is extremely probable that the point at which the bore was stopped was not *bed rock*, but an included erratic that had come in line with the sinking and given the false impression that bottom had been touched. The section is, however, an extremely interesting one, and supplies evidence of the great thickness of glacial deposits that occur over the southern portions of the peninsula.

Concluding Remarks.

In the observations now detailed a very large area has been added to the known extent of the extinct glacial field of South Australia. The glacial outline has not only been carried across Gulf St. Vincent, but it is clear that practically the whole of the southern portion of Yorke's Peninsula, measuring, roughly, forty miles by twenty miles, has been at one time under glacial conditions. This conclusion has been forced upon me from the widely distributed proofs of ice action on the northern and southern coasts as well as throughout the inland districts. With the exception of a few outliers of Eocene limestone and some superficial deposits, the geology of the inland country is of a uniform character, and can be summed up in one great clay formation—the glacial clay. A unique feature of the district is the abundance of salt lagoons, of which there are no less than 200 recorded on the official maps within the area under consideration. There can be little doubt that the glacial clay underlies these lagoons and imparts to them the retentive quality, so that these saucer-shaped depressions, receiving the drainage of the country, play the part of evaporating pans and concentrate its salts. The waste of this clay along the banks of the lagoons leads to the exposure of the erratics belonging to the formation, some of which have been noted in this paper.

Another important datum line has been supplied by these observations bearing on the age of the glacial cold in these latitudes. At Hallet's Cove, on the opposite side of the Gulf, the evidence shows that the glacial deposits were laid down in pre-Miocene times. In southern Yorke's Peninsula the geological age of these deposits has been thrown back yet one more step through their occupying a stratigraphical position inferior to the Lower Tertiary. There is, moreover, clear proof of stratigraphical unconformability in the eroded* surface of the glacial clay on which the marine beds of the Older Tertiary rest. It is, therefore, I think, clear that the glaciation must be referred to pre-Tertiary times, and cannot be newer than a Cretaceous or Cretaceo-Eocene age.

The discovery of glacial clay inferior to the Eocene beds at Troubridge Hill and Point Turton will contribute to the correlation of beds of a similar character in other parts of the colony. On the north side of the mouth of the Onka-

* At Corney Point, where the metamorphic rocks rise above sea level, there is a thin layer of Eocene limestone in a limited patch resting upon the primary rocks. The glacial clay is absent. At this elevation it may have been originally a thin deposit, and therefore easily denuded before the bedrock sunk below the level of the Eocene sea.

paringa, a clay in all respects similar to the glacial clays of southern Yorke's Peninsula, rises from beneath the fossiliferous Eocene beds with a northerly rise. A similar clay underlies the Eocene of Queenstown, Kangaroo Island, referred to by the author in a previous communication. From the apparent absence of erratics in these exposures some hesitation has hitherto been felt in referring the beds to the glacial age, but the evidence now available has greatly strengthened this supposition, and makes it almost certain that they belong to the same formation.

We have no reason to conclude that the extent of the glacial area in South Australia has even yet been fully determined. The limits of the evidence on Yorke's Peninsula, in a northernly direction, have not been fixed, and it is possible that the ice of a long past age may have left its impress on the southern portions of Eyre's Peninsula much further to the west. It is in these directions that further investigations should be especially made.

My acknowledgments are due to Mr. E. H. Matthews, of Yorketown; Mr. C. S. Keightly, Warooka; Mr. James Caldwell, junr., Honiton; and Mr. William Fowler, Yararoo, for information and other facilities by which I was enabled to utilise the short time at my disposal to the best advantage.

Supplementary List of Plants from Mount Lyndhurst Run.

By Max Koch.

[Read June 5, 1900.]

In my lists of plants collected on Mount Lyndhurst Run, published in September, 1898, 334 species of indigenous plants were recorded. In the following supplementary list I enumerate 56 species. In addition to the 390 indigenous species, about 20 of introduced plants were noticed, of which *Sonchus oleraceus* and *Erodium cicutarium* may be regarded as well established.

Most of the plants of this list were named by Prof. R. Tate, Adelaide, and some by Mr. J. H. Maiden, Director of the Botanic Gardens, Sydney.

The most of the species are more or less rare in District S., and some 25 of them have not been recorded from there before; these I have marked by asterisk.

Cruciferæ.

*Erysimum lasiocarpum, *F. v. Mueller.*
Lepidium leptopetalum, *F. v. M.*
Sisymbrium filifolium, *F. v. M.*

Rutaceæ.

Geijera parviflora (?), *Lindley.* Collected by W. Langley.

Zygophylleæ.

*Zygophyllum crenatum, *F. v. M.* Collected by J. Langley.
*Zygophyllum hybridum, *Tate.*
*Zygophyllum Kochii, *Tate.* First seen by J. Langley, Trinity Well.

The genus Zygophyllum had occupied my attention during last spring, for I noted in the preceding year various forms which seemed to me different from those described in the handbooks at my disposal. Fortunately, almost all known species of Zygophyllum were growing in my neighbourhood, with the exception of *Z. glaucescens*, which was erroneously enumerated in my list of 1898. Professor Tate upheld me in my assumption of having found several new species, two of which he described and named (*vide* Tr. R.S., October 3, 1899, pp. 289-291).

In addition to these, the learned Professor admitted the occurrence of micromorphs as regards the corolla of *Z. ammophilum.* My No. 164 is the typical form of *Z. ammophilum ;* leaflets elliptical to linear cuneate, entire ; petals white, stamens four, seeds two in a cell, outer skin of seed rough (not shining). No. 458, *Z. ammophilum*, var.; petals white, stamens eight, fruits and seed the same as No. 164. No. 457, *Z. ammophilum*, var. or new species (?) ; leaflets broadly cuneate, notched ; petals yellow, stamens eight, fruits truncate, rounded at the base, deeply angled ; seeds one in a cell, of an oval shape—the outer skin of the seed is smooth and polished ; a small prostrate annual. It will be seen this form differs from the typical form in—

(1) Foliage—164 leaflets entire ... ... 457 leaflets notched
(2) Colour of corolla—164 white ... 457 yellow
(3) Number of stamens—four ... ... eight
(4) Number of seeds in a cell—two ... one
(5) Form of seed—almost three angular... oval in outline
(6) Outer coat of seed—dull and rough ... smooth and polished

I have supplied Prof. Tate with more material to work upon, and would not be surprised if he decides to raise No. 457 to specific rank. This form being prostrate in its habit, and the smallest of the genus, I suggest as an appropriate name *Zygophyllum humillimum.*

Malvaceæ.

Plagianthus glomeratus, *Bentham.*
*Sida intricata, *F. v. Mueller.*

Euphorbiaceæ.

Phyllanthus Gunnii, *J. Hooker.* A shrub.

N.B.—*Phyllanthus rhytidospermus* should be struck off my list of 1898.

Chenopodiaceæ.

An examination of Prof. Tate's Herbarium at the University has convinced me that the following species in list 1898 should be struck off :—

Atriplex leptocarpum, *F. v. M.*, for which I now assign *A. angulatum*, var., as the correct name.
Bassia bicornis, for which *B. diacantha* seems to be a better reference.

Amarantaceæ.

Ptilotus Hoodii, *F. V. Mueller.*

Leguminosæ.

Further study has revealed the fact that *Glycina tabacina*, in list 1898, is wrong, and should be Glycine sericea, *Bentham.*

Acacia salicina, *Lindley.*

Acacia cibaria, *F. v. Mueller.* This tree, or often shrubby tree, resembles so much in habit, foliage, and form of flowers to *Acacia aneura* that the species could not be defined until ripened fruits were obtained. *Acacia cibaria* is the species the seeds of which the blacks gather for food, and it is called by them *Mulka*, or by another tribe *Wodnera*, the same as *Acacia aneura.*

Both species are highly valuable as fodder for cattle and horses, and are often cut down for sheep in protracted droughts.

Ficoideæ.

*Mesembrianthemum australe, *Solander.* Collected by W. Langley, Knob Well.

Aizoon zygophylloides, *F. v. M.* The form with pink sepals, No. 354, is growing abundantly on the salt plains near Catt's and Publichouse Springs, north of Trinity Well.

Myrtaceæ.

Melaleuca trichostachya, *Lindley.*

Melaleuca parviflora, *Lindley.* Black Teatree.

Loranthaceæ.

Loranthus exocarpi, *Behr.*

A form with yellow petals, and green at the summit, is often found.

Compositæ.

*Aster decurrens, *Cunningham.*

*Podocoma cuneifolia, *R. Br.*, var. 348. Leaves pinnate, and flowers much smaller than the legitimate form.

*Podocoma cuneifolia, *R. Br.*, var. 476. Leaves twice pinnate.

Minuriella annua, *Tate.* A small annual, first found in horse paddock of the "Village Well" on Mount Lyndhurst, but later on frequently met with on pipeclay soils throughout the district.

*Pterigeron microglossus, *Bentham.*

Podolepis Siemssenii, *F. v. Mueller.*

Helipterum corymbiflorum, *Schlechtendal.*

Helipterum incanum, *DeCandolle.*

Helipterum pterochaetum, *Bentham.*

*Helichrysum lucidum, *Henckel.*

Calocephalus platycephalus, *Benth.*

Calocephalus sp., No. 481 (?). Flowers too imperfect for specific denomination. It is a low perennial, with rigid, divaricate branches, stems, and leaves, which are short, densely woolly.

Goodeniaceæ.

Scaevola humilis, *R. Brown.*

Convolvulaceæ.

*Cuscuta australis, *R. Brown.*

Borragineæ.

Heliotropium asperrimum, *R. Br.* Collected by W. Langley.

Asclepiadeæ.

Cynanchum floribundum, *R. Brown.*

Jasmineæ.

Jasminum lineare, *R. Br.*

Solanaceæ.

Solanum eremophilum, *F. v. Mueller.*

Lentibularineæ.

Utricularia dichotoma, *Labillardiere.* Collected by J. Langley at Publichouse Springs, "north of Trinity Well," growing in shallow waters.

Myoporineæ.

*Myoporum deserti, *Cunningham.* A shrub.

Myoporum platycarpum, *R. Brown.* Sandalwood. Aboriginal name in the Dieyerie dialect, *Yumburra.*

*Eremophila Freelingii, *F. v. M.* A colour variety; flowers white. The typical shrub has a lavender corolla. Found by J. Langley near Trinity Well.

Juncaceæ.

Juncus bufonius, *Linne.*

Typhaceæ.

Typha angustifolia, *Linne.* Near Walparinna Springs.

Cyperaceæ.

On account of the difficulty of procuring well-matured specimens of these Cyper grasses, as they are largely cropped by stock, it seems to be impossible to arrive at a final and satisfactory result with some of the species, and the names given here must be considered as provisionally applied, and as liable to be improved upon.

*Cyperus castaneus, *Willd.* A dwarf annual (perhaps a variety, or, if not, a new species). New for the province of South Australia.

*Cyperus squarrosus (?), *Linne.* A form or an undescribed species.
Scirpus lacustris (?), *Linne*

Eriocauleæ.

*Eriocaulon submersum, *Tate.* Grows under water, except the tips of the leaves and the flowering stalk. First seen at Publichouse Springs by J. Langley, Trinity Well.

Gramineæ.

Panicum decompositum, *R. Brown.*
*Panicum adspersum, *Trinius.*
*Panicum sanguinale, *Linne.*
Spinifex paradoxus, *Bentham.*
*Andropogon bombycinus, *R. Br.*
Stipa aristiglumis, *F. v. M.*
*Agrostis Solandri, *F. v. M.*
*Eriachne scleranthoides, *F. v. M.*
*Diplachne Muelleri, *Bentham.*
*Diplachne fusca, *Palisot.*
*Distichlis maritima, *Rafinesque.* Near salt lakes, Publichouse Springs.

Filices.

Grammitis rutaefolia, *R. Brown.*

Characeæ.

*Nitella sp. Not sufficiently developed to admit of specific denomination. A weed growing under water in mud tanks.

Introduced Plants.

Avena fatua, *Linne.*
Anagallis arvensis, *Linne.* Flowers brick-red.
Anagallis arvensis, var. caerulea, *Schreb.* Flowers blue.

Definitions of Two New Species of South Australian Polyplacophora.

By Edwin Ashby.

[Read September 3, 1900.]

The discovery of the two new species of mollusca described in this paper is one of the many valuable results of Dr. Verco's dredging trips. Their discovery is of particular interest, because both genera are, as far as our present knowledge goes, very poorly represented in any part of the globe. Only one species of *Callochiton* has before been recorded from this colony. Henry A. Pilsbry, in his "Manual of Conchology," says of this genus and its allied genera—"Of the whole series there are very few species known. All of them are rare." And the other subgenus *Stenochiton* is only represented by two or three species, though the allied subgenus *Stenoplax*, to which the species herein described bears some affinity, is a little better represented; but no representative has yet been recorded from this colony.

Ischnochiton (Stenochiton) pallens, *sp. nov.* Pl. i., figs. 1*a*—*g*.

General Appearance.—Shell glossy, elongated, anterior portion tapering to rear. Evenly arched and rounded, side slope curved. *Colour.*—Cream, mottled with pink and pale brown.

Anterior Valve.—Smooth and glossy, except for several growth lines—that nearer the outer margin being the deeper. This valve is longitudinally much shorter than is the case in *Stenochiton juloides* and *S. Pilsbryanus*. Slits 13, at very irregular distances apart.

Posterior Valve. — Shield-shape tapering rapidly, mucro posterior, only slightly raised. A deep sulcus traverses the whole valve a short distance from the margin, preserving the shield outline of the shell. A shallow diagonal depression crosses the valve from the mucro to the suture. Surface of shell glossy and smooth, slight growth lines visible under the microscope. Slits six; the teeth are very irregular in contour.

Median Valves.—Uniformly smooth and glossy, showing numerous growth lines, which are continued right across the dorsal area. The three areas are hardly distinguishable, except that the lateral area is slightly raised. The posterior margin is finely serrated like a file where the valves are not worn. Four of the median valves have one broad wedged-shaped slit on each side; two valves have two slits on each side. Inside of shell

glossy white, sinus broad and shallow, sutural laminæ only slightly produced.

Girdle.—Under pocket lense appears whitish and felt-like. The margined fringed with white spicules, but under one-inch objective the girdle is seen to be crowded with masses of small irregular imbricating scales, which are finely striated.

Measurement.—Length, 26 mm.; breadth, 7 mm.

Habitat.—St. Vincent's Gulf; dredged by Dr. Verco.

Remarks.—This species is much broader in proportion to its length than *juloides*, the first valve being the broadest and very rounded, the width being fairly maintained to the sixth valve inclusive. Valves seven and eight taper rapidly, the latter being almost pointed. It is also easily distinguishable from *juloides* and *Pilsbryanus* by the anterior valve being longitudinally much shorter, the creamy white colour, and the densely irregularly scaled girdle. I am indebted to Dr. Verco for specimens of this and the following species.

Callochiton rufus, *sp. nov.* Pl. i., figs. 2*a*—*g*.

General Appearance.—Shell oval, width three-fifths of total length, carinated, side slopes very curved. *Colour.*—Uniformly bright terra-cotta red, both shell and girdle, with the exception of a small white spot on dorsal area of valves three to eight, and the lateral area of valve seven, which is pure white; from this valve a white line traverses the girdle; also the four first valves have a light spot on the posterior margin.

Anterior Valve.—Under pocket lense quite smooth, with the exception of a few concentric growth lines. Megalospores are very distinct under compound microscope. Slits 11, teeth crenulate, which appearance is caused by the slight projection of the props. The spongy character of the eaves is continued in the slits between the teeth.

Posterior Valve is almost equally divided into two areas, the dorsal, or central, broadly wedge-shaped, traversed by eight longitudinal strongly raised ribs, similar to those of the pleural areas of the median valves. Mucro median, although shallow, decidedly more prominent than in *C. platessa*. Posterior area smooth, decidedly raised at the junction with the dorsal area. Slight concentric growth lines are discernible.

Median Valves.—Lateral area much raised, slight growth lines; also two or three shallow vertical sulci just distinguishable. Densely pitted with megalospores, which are very distinct. Pleural area longitudinally ribbed with scimitar-shaped riblets. The pits between are very deep where they join the lateral area. Dorsal area is raised, wedge-shape, divided from the pleural area by a deep spindle-shaped pit, tapering off into a curved groove at

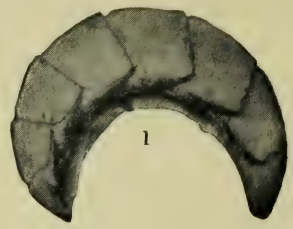
anterior margin. A small white spot on valves three to eight. Slightly beaked. Under one-inch objective this area is closely ribbed with wavy longitudinal riblets. Slits two each side, eaves very spongy, teeth propped.

Girdle.—Broad, under pocket lense leathery, same red colour as valves, fringed at margin. Under one-inch objective is seen to be densely clothed with evenly packed, long, linear scales or spicules. These are arranged in rows, the apices curving across to the next row.

Measurement.—Length, 16 mm.; breadth, 10 mm.

Habitat.—Dredged St. Vincent's Gulf by Dr. Verco; one specimen only.

Remarks.—In general appearance this species closely resembles the bright red form of *Chiton tricostalis*, but on closer inspection the sculpture is seen to be widely different. The ornamentation in some respects approximates to *Callochiton platessa*, but that species is much more strongly pitted or decussated, and the longitudinal scimitar-shaped sulci are absent; also it is more strongly beaked than the species now described. Only one specimen has been obtained, and only the insertion plates of the first two valves have been examined.



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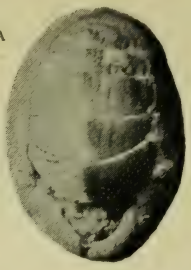

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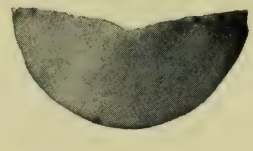

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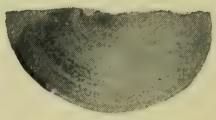

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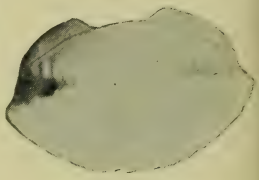

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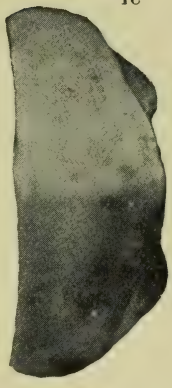

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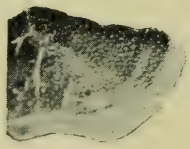

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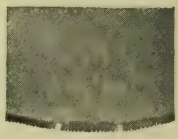

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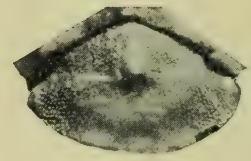

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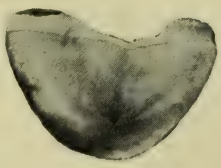

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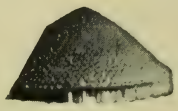

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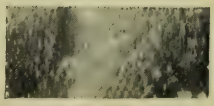

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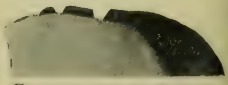


1G

1. Ischnochiton (Stenochiton pallens)

2. Callochiton rufus

3. Chiton oruktus

Definition of a New Species of South Australian Polyplacophora.

By M. M. Maughan.

[Read September 3, 1900.]

Chiton oruktus, *sp. nov.* Pl. i., figs. 3*a*—*g*.

General Appearance.—Shape oblong, oval, very elevated, carinated, side slopes steep and slightly curved. Shell sloping back from about valve five. *Colour.*—Greyish green, mottled with olive. Anterior valve slightly lighter in colour than the rest. Dorsal areas tipped with reddish tinge. Girdle same colour as valves, with dark olive stripe opposite each lateral area, and at intervals round anterior and posterior valves.

Anterior Valve.—Steep, almost smooth, but showing scarcely perceptible radial costæ, and under the lense concentric wrinkles, faintly imbricating. Slits eight.

Posterior Valve.—Small, about half width of valve three. Mucro anterior. Posterior slope nearly straight. Posterior area ornamented with faintly imbricating concentric wrinkles like the lateral areas of other valves. Immediately in front of this area are the deep wedge-shaped pits described below. Slits eight.

Median Valves.—Dorsal area beaked, merging into the pleural area, faintly wrinkled with what appear to be growth lines. The marked feature of this shell is the row of about 12 parallel, very short, deep, wedge-shaped pits in the pleural areas, beginning from the edge of the lateral areas. They make an angle of about 120° with the direction of the transverse growth lines. Lateral areas are elevated with very low, flat, longitudinal, faintly imbricating divisions. Slits 1.1. Insertion plates with pectinated sinus broad, denticulated with 12 slits. A strong triangular rib, with apex at the posterior margin of the insertion plate, is seen inside of each of valves two to seven. Colour of articulamentum greenish white.

Girdle.—Scales smooth, wide, and very obtuse at apex.

Measurement.—Length, 20 mm.; width, 10 mm.

Habitat—McDonnell Bay; found by Dr. W. G. Torr, to whom I am indebted for specimens.

EXPLANATION OF PLATE I.

a. Dorsal view of entire shell.
b. Anterior valve.
c. Median valve.
d. Posterior valve.
e. Anterior valve showing teeth.
f. Portion of girdle magnified.
g. Insertion plate, median valve.

Fig.
1. Ischnochiton (Stenochiton) pallens.
2. Callochiton rufus.
3. Chiton oruktus.

Descriptions of New Genera and Species of Australian Mollusca (chiefly Tasmanian).*

By Professor Ralph Tate and W. L. May.

[Read October 2, 1900.]

Lampusia nodocostata, *spec. nov.*

Shell fusiform, rather slender, light-brown. Whorls (excl. proto-conch) four and a-half, convex, but obtusely angulated in the middle. Embryonic whorls incomplete, one and a-half preserved, smooth, rounded, relatively large (2·75 mm. diam.), suggestive of a styliform proto-conch similar to that of *L. exarata*, but on a larger scale.

Costæ subacute, with about three nodulations on the anterior half; six intervariceal costæ. Varices similar to the costæ, except that they are stouter; seven in all.

The spiral ornament consists of crowded threads, which are obscurely granulated; 24 on the penultimate whorl, of which three on the anterior half of the whorl are broader, and originate the nodulations on the costæ.

Last whorl about two-thirds the total length of the shell. The costæ are extended to the base, and the nodulation is continued below the periphery, corresponding with the intercrossing of six broader spiral threads, which are regularly disposed; the interstitial spaces between the broader threads are occupied by about eight smaller spiral threads.

Aperture quadrately oval; beak short, considerably upturned. The columella is smooth, and the outer lip is not dentate (the shell is probably not full grown).

Length, 31; breadth, 16; length of aperture and canal, 17 mm.

East Coast, Tasmania; two examples *(W. L. May)*.

This species appears from the description and figures of *Triton tenuiliratus*, Lischke, Japan Meer-Conch., to be closely related thereto; but differs by details of ornament. *T. granulatus*, Dunker, is the only Australian species of the genus unknown to

* It is anticipated that figures of the new species and other unfigured Tasmanian species will be published early next year by the Linnean Society of New South Wales, to accompany a paper entitled "Revised Census of the Marine Mollusca of Tasmania," as time does not permit of their preparation to accompany this issue.

us, but as it is said to belong to Section Simpulum, whereas our species belongs to Gutturnium, the two must be regarded as distinct.

Cantharus kingicola, *spec. nov.*

Shell fusiformly oval, somewhat solid; *colour* opaque-white, except the summit, which is pale-orange.

Nucleus small, of two and a-half smooth, convex turns. *Spire-whorls* five, slopingly convex, subangulated towards the anterior by reason of the greater volume of the axial costæ. The *axial* ornamentation consists of close, elevated, rounded, straight costæ (twelve on the penultimate whorl), which thicken very rapidly as they approach the front suture (there they are about twice as wide as the interspaces). The *spiral* ornament consists of roundly compressed valid liræ (seven on the penultimate whorl) which cross the costæ, and of a sutural adpressed band.

Body-whorl convex, contracted anteriorly; there are twelve axial costæ, which are most developed at the rounded periphery, and become evanescent in front of it; there are about 15 spiral liræ, fairly regular, with occasional interstitial threadlets, and there is a sutural band.

Aperture elongately oval, half as long as the shell. Outer lip uniformly convex, varicosely dilated; acute, prominent lines within. Columella concavely arcuate, not plaited at the base. Beak short, rather wide, slightly upturned.

Length, 18; width, 9 mm.

King Island; two specimens.

Marginella cratericula, *spec. nov.*

Roundly obconic, somewhat bullæform, having the general features, as regards shape of a *Bullinella*, translucent, shining, bluntly rounded posteriorly (where the shell is widest), rapidly attenuating to the subacute front. Spire concealed and sunken to form a shallow crateriform depression.

Outer lip slightly thickened, smooth on the inner margin. Columella with two closely approximate large plaits; the anterior one the larger, terminating in a slight anterior emargination.

Length, 2·3; width, 1·5 mm.

D'Entrecasteaux Channel, Tasmania; 10 fathoms (*W. L. May*), two examples.

This species is conspicuous by its impressed spire, which separates it from all other Marginellidæ.

Marginella multiplicata, *spec. nov.*

Shell minute, rather solid, shining white, having much the shape of *M. Isseli*. Spire concealed. Aperture equalling the total length of the shell, but not extending much beyond the

summit; slightly arched, narrow, of nearly equal width till it slightly widens at the everted front. Outer lip thickened and well-margined all round, smooth within. Columella with one strong oblique plait at the front, which is succeeded on the pillar by seven transverse thread-like plaits; the columella-plait runs out to form the left margin of a shallow and wide effuse notch.

Length, 1·6: width, ·95 mm.

Tasmania, *W. F. Petterd!*.

This species much resembles *M. Isseli*, Nevill (*M. nympha*, Braz.), but it has more plications, and the outer lip is smooth; from *M. cymbalum*, which is a much larger shell, it is more narrowed anteriorly, and the plications of a different type. *M. Hallii* is truncated at the apex. *M. alternans* appears to resemble it, and though they have the same number of plications, yet their dispositions are so distinctly different that we must regard them, in the absence of actual comparisons, as distinct.

Marginella biplicata, *spec. nov.*

Shell small, cylindroid, pellucid, straw-coloured. Spire very obtuse, of three and a-half whorls, scarcely exserted. Aperture narrow elongate, widening to the front, obtuse-angled posteriorly. Outer lip scarcely thickened: not ascending on the spire, its junction marked by a slight retiring angle; smooth on the inner side. Columella with two strong oblique plaits at the front—the posterior one is slightly the stronger; anterior emargination well-defined.

Total length, 4; greatest width, 2 mm.

Port Esperance, Tasmania; in 24 fathoms, 2 exs. (*W. L. May*).

It is nearest to *M. stanislas*, but is shorter and relatively broader, and the apex is more obtuse, whilst the most prominent differences are in the smooth inner lip and biplicated columella.

Marginella Simsoni, *spec. nov.*

M. denticulata (pars), Tate, non Conrad.

M. minima, Petterd, non Sowerby.

Shell pyriform, contracted in front, shining, white. Spire immersed, though not wholly concealed. Aperture as long as the shell, slightly everted in the young. Outer lip thickened, smooth. Columella with about ten plications, decreasing gradually in size from the front.

Length, 1·9; greatest width, 1·3 mm.

Tasmania and South Australia.

M. minima, Petterd, the type of which we have studied has a length of 1·4 and a breadth of 1·0 mm., and besides being smaller than *M. denticulata* it is slightly more attenuated to the front, and the outer lip is not thickened; differences which may be attributed to a young age.

The description of *M. denticulata*, Tate, is inapplicable, because it was based on two species—one specimen supplied the characters "denticulated margin and four-plicate columella" with exsert spire (it is a young micromorph of *M. Strangei*); the other, "pyriform shape and immersed spire," with a smooth outer lip and multiplicate columella, is *M. Simsoni*.

Marginella Mayii, Tate *(spec. nov.)*.

Shell of an elongately oblong-oval shape; the body-whorl rather rapidly tapering from the rounded shoulder to the base; spire obtusely conical, blunt at the apex.

Test thick, smooth, polished. General colour chestnut-brown, relieved on the spire by lighter colour at the posterior sutures; on the last whorl it is interrupted by a narrow light-coloured band at about the posterior one-third, and also at the base; the dark coloured bands are deeper tinted at their margins; the thickened aperture, all round, is opaque white.

Whorls five, nearly flat; the last convex posteriorly, and of an even slope thence to the snout.

Aperture three-fourths the total length of the shell, narrow, the outer lip making an acute angle posteriorly; about 2 mm. wide medially, narrowing thence to the front to about half. Outer lip thickly and broadly callously thickened on the outside, ascending to about one-half the height of the penultimate whorl; denticulated within (except towards the extremities). Columella stoutly four-plaited, plaits subequal, the posterior pair more transverse than the anterior pair.

Total length, 12; length of aperture, 9; maximum width, 6 mm.

Frederick Henry Bay (type) and East Coast of Tasmania (*W. L. May*); Derwent Estuary (*E. Harrison*).

Among Australian congeners *M. Mayii* comes near to *M. pygmæa*, but is of very much larger size; it is, moreover, more attenuated anteriorly, and especially differs by its outer lip variced outside and denticulated within; also near *M. Allporti*, which it resembles in its denticulated outer lip and coloration, but differs by longer and attenuated spire and larger size.

I have much pleasure in adopting for this shell the name of my coadjutor, under which name it has been distributed [*R. Tate*].

Marginella ovulæformis, *spec. nov.*

Shell minute, ovate, attenuated at the ends, regularly convex, white, shining. Spire concealed, the aperture extending backward beyond it.

Aperture narrow, arcuate, bluntly rounded posteriorly, slightly expanding to the front, ending there in a slight emargination, which is curved to the left. Outer lip thin,

blunt-edged, edentulous. Columella with a strong terminal spiral plait running out to form the left margin of a deep and somewhat effuse canal.

Length, 1·5; greatest width, 1 mm.

Tasmania (*W. F. Petterd !*).

This species and *M. lubrica* are characterised among recent Marginellidæ by their uniplicate columellas, but that type has an ancestral form in an Eocene species at Muddy Creek. In shape, *M. ovulæformis* is somewhat intermediate between *M. Flindersi*, with two plaits, and *M. Hallii*, with seven plaits; *M. Isseli* is also near, but it has four plaits, and is not so attenuated at the ends.

Donovania fenestrata, *spec. nov.*

Shell moderately stout, narrow lanceolar-fusiform, pale-fawn colour. Pullus papillary of three, inflatedly convex smooth whorls, somewhat rapidly diminishing in size. Spire-whorls five and a-half, moderately convex, separated by a deeply impressed suture; ornamented with spiral and transverse ridges of equal strength, which produce square deep fenestrations; there are five spiral ridges, and on the penultimate whorl there are about twenty axial ones.

Last whorl convex, with seven spiral ridges to the periphery—three on the concave area below it, and four on the snout.

Aperture roundly oblong, higher than wide; outer lip entire, vertical in contour, simple, ridged inside, corresponding with the external furrows. Columella arched to its base, thence running out abruptly and obliquely to form the left boundary of a short, wide, slightly up-turned snout.

Length, 8; width, 2·75; height of aperture, 2·75 mm.

East Coast of Tasmania (*W. L. May*).

Natica Tenisoni, *nom. mutand.*

N. nana, Ten.-Woods, P.R.S., Tasm., 1876, p. 149, non Möller.

Long Bay; Ten.-Woods.

Thylacodes caperatus, *spec. nov.*

Shells agglomerate, reddish brown; whorls embracing and reciprocally adherent, forming a short broad cone, ornamented with close-set, rounded, irregularly-sized, transverse ridges; suture distinct. The free tubular portion long, much narrowed, irregularly bent, circular in section; ornamented as the rest of the shell.

Diameter of base, 4 to 5; height of cone, about 2; length of tube, up to 10; its diameter, 1 mm.

Tamar Heads, Tasmania; *W. F. Petterd !*.

Animal unknown, but from its resemblance to some Tertiary species in Australia it is associated with *Thylacodes* rather than with *Vermetus*.

Turritella Atkinsoni, *spec. nov.*

This species was described as new by Tenison-Woods in 1877, under the name of *T. Tasmanica*, which makes double employment with Reeve's species; and in the following year it is quoted by him in his "Census" as *T. Tasmaniensis* (a typographical error). It would appear that he had subsequently admitted the need of a new specific denomination, and the shell has been locally known as *T. Atkinsoni*. Though its authorship is not traceable in print, we utilise it with ready willingness.

T. Woods's description is rather misleading, as it implies a bicarinated species, whereas there are four large keels on the penultimate whorl—the peripheral one is the largest, the posterior two smaller, and the anterior one is nearly as large as the peripheral one, with or without a slight band at one or both sutures. Its closest relative is *T. austrina*, Watson, of Kerguelen Island; but the Tasmanian shell has interstitial spiral striæ, and the sinus-lines are deeper and wider.

Long Bay, *Ten.-Woods;* Port Esperance, *W. L. May.*

T. Godeffroyana, Donald, Mal. Soc., IV., p. 53, t. 5, f. 6-6*a*, 1900, which is founded on a single specimen, may be an individual variation; it has *three* strong keels.

Scalaria (Acrilla) minutula, *spec. nov.*

Shell minute, moderately thick, cylindroid-turreted. Spire-whorls five, pale yellow-brown, flatly convex, and slightly angulated in the posterior-third, separated by a linear suture, bounded anteriorly by a spiral thread; ornamented by slender slightly oblique ribs, about 15 on the penultimate whorl, which are somewhat bent at the angulation, the interspaces are as wide, and smooth. The translucent-white apex consists of a convex, relatively wide, three- to four-carinated whorl, and of a small hemispheric tip.

Last whorl flatly convex to the acute margin defining the base, base smooth.

Aperture oblong, somewhat effusively expanded at the front; peristome incomplete; outer lip thin, shortly insinuate at the suture; columella thin, nearly straight.

Length, 2; breadth, ·57 mm.

Tasmania, *W. L. Petterd!;* W. Coast of S. Australia, *R. Tate!;* Victoria, *J. H. Gatliff!*

Eulima inflata, *spec. nov.*

Whorls slightly irregularly convex; penultimate whorl somewhat contracted; last whorl much inflated, regularly convex. Aperture relatively small, roundly oval, hardly oblique. Outer lip not retreating at the sutural margin.

Length without apex, 6·25; width, 3 mm.

This species resembles *E. Tryoni*, but is thinner, and is a longer shell for the same number of whorls—the whorls are more convex; whilst *Tryoni* has a more oblique aperture, narrower base, which is oblique on the left side.

In the absence of the tip, it is uncertain to place the species in the Section Mucronalia, to some species of which it has some resemblance.

North Coast of Tasmania; *W. F. Petterd!*.

Eulima Mayii, *Tate, spec. nov.*

Shell solid, white, highly polished. Spire with a slight apical twist from before backward, gradually tapering to an extremely attenuated tip. Whorls fourteen, flat. Aperture elongate-oval, or a little higher than wide, slightly oblique; outer lip retreating from the middle line to the suture.

Length, 7·75; width, 2·5; height of aperture, 2·25 mm.

Seems to resemble *E. intermedia*, but has the last whorl approximately about half the length of the shell, instead of one-third, as in the Mediterranean species.

I employ the species-name in compliment to my coadjutor, under which it has been known in manuscript among Tasmanian collectors [*R. Tate*].

East Coast of Tasmania, south of Swansea; *W. L. May.*

Eulima Tryoni, *spec. nov.*

E. Tenisoni (pars), Tryon, Man. Conch., VIII., t. 68, f. 16, non p. 269; *E. Tenisoni*, Tate, T.R.S., S. Aust., XXII., 1898, p. 81.

This is the shell figured by Tryon as *E. Tenisoni*, but it is a different species to *E. micans*, T.-Woods, to which he applied that name. It is related to *E. latipes*, Watson, which has a broader base, patulous outer lip, and has a somewhat rapid increase of growth of the spire.

Common in S. Australia; also Victoria; and at Derwent Estuary, Tasmania, *W. L. May.*

Stylifer Petterdi, *nom. mutand.*

S. robusta, Petterd, Journ. Conch., 1884, p. 140, non Pease, 1860.

Leven Heads, Tasmania.

Syrnola Harrissoni, *spec. nov.*

Shell lanceolate, thin, hyaline, smooth, white. Apex heterostrophe, small, of one and a-half whorls. Spire whorls five, rapidly increasing in size, nearly flat, suture impressed (the specimens examined are more or less corroded, and present, in consequence thereof, a shoulder at the posterior suture).

Aperture elongate-oval, somewhat expanding anteriorly; columella with a very prominent spiral plait.

The shell is variable in its proportionate dimensions. The figured specimen has length, 3; width, 1; a large example has breadth, 1·5; length of aperture, 2; estimated length, 5·5 mm.

Off Brown's River, Tasmania, *E. Harrisson!*.

Syrnola Petterdi, *nom. mutand.*

Obeliscus Tasmanicus, Petterd., Jour. Conch., 1884, p. 40; non *S. Tasmanica*, Ten.-Woods (Styloptygma), 1877.

Tasmania.

Syrnola punctospira, *spec. nov.*

Shell minute, acuminately oval, rather thin, sub translucent. Spire whorls three and a-half, convex, of rather rapid increase, sculptured by forward-curved striæ and distant indistinct lineations; suture impressed. Pullus of one and a-half hyaline, exsert whorls continued into an erect loop with an immersed tip; its last whorl graduating in size to the first spire-whorl, somewhat inflatedly rounded and sculptured by ten spiral rows of punctures. Aperture elliptic-oval, front lip slightly effusively dilated on the left; columella with a large twisted plait.

Length, 2·25; greatest width, 1·0 mm.

George Bay, Tasmania, *W. F. Petterd!*.

A minute shell, with well-rounded and rather rapidly-increasing whorls, with a distinctive sculptured pullus. Several examples.

Odontostomia deplexa, *spec. nov.*

Shell minute, imperforate, moderately stout, smooth, shining, white, sculptured with microscopic growth-lines (without spiral striæ). Whorls five, of moderate increase, convex, slightly protuberant at the posterior suture. Pullus concealed, except the papillary-like tip of the loop.

Aperture oval, columella with a strong transverse fold at its origin.

Length, 3; width, 1·1 mm.

Most like *O. lævis*, but the whorls are more convex, shell more cylindroid, besides being much smaller.

Frederick Henry Bay, Tasmania (*W. L. May*); S. Australia (*R. Tate*); Victoria (*J. H. Gatliff!*).

Odontostomia varians, *spec nov.*

Shell small, acuminately oval, moderately stout, dull white (dead). Pullus pellucid, smooth, papillary as a whole, forming a small lop-sided bend. Whorls five, flatly convex, separated by a broad deep suture; sculptured by four deep narrow spiral grooves, separating flat interspaces of dissimilar width (the first

three are relatively wide, the second and third of about the same width, but wider than one; the fourth is a slender lineation sunk in the sutural canal). The first and second ligatures are broken-up into blunt, straight, axial ridges, separated by about as wide indented interspaces.

Aperture oval, peristome thin. Columella slightly arched, forming a blunt roundly-effuse angle at the front; thinly and sparingly exsert to form an umbilical chink; there is a slender transverse plait at its summit.

Length, 3; width, 1·4 mm.

Of six examples two are in accord with the foregoing description. A third and fourth, which are translucent horn-colored, have the first and second ligatures studded with small granules; whilst the fifth and sixth, also translucent, are without ornament, and the spiral furrows are feebly developed and barely traceable on the body-whorl.

D'Entrecasteaux Channel, Tasmania (*W. L. May*).

Genus Pseudorissoina, *Tate* and *May*.

Type :—*P. Tasmanica*, Tenison-Woods (*Stylifer*).

Apex sinistral, spire and aperture like Rissoina (*e.g.*, *R. nivea*).

The unique species was originally described as belonging to *Stylifer;* Tryon, who figures an authentic specimen, says of it—"Is it not rather an *Eulima?*" Our study of the species confirms Ten.-Woods' statement that the apex is sinistral—indeed, whilst having the spire and aperture of a *Rissoina*, like *R. nivea* (the shell is, however, smooth), it has the heterostrophe loop-like nucleus of *Eulimella*. Such a combination of characters seem to be unprovided for in the families Pyramidellidæ or Rissoidæ, hence the new generic designation. Briefly, this new genus is a Pyramillid with a Rissoina aperture or a Rissoinid with a Pyramilloid nucleus. The higher value of the nuclear character in classification induces us to place it, in Pyramidellidæ, near *Eulimella*.

Turbonilla admiranda, *nom. mutand.*

Elusa bifasciata, Ten.-Woods, P.R.S. Tasm., 1877, p. 150; non *Turbonilla bifasciata*, A. Adams, 1861.

T. festiva, Angas, P.Z.S., 1877, t. 5, f. 4; non Folin, 1867.

Victoria, Tasmania, and N.S. Wales.

Rissoia (Apicularia) demessa, *spec. nov.*

Shell minute, strong, pale-brown. Spire-whorls four, convex, ornamented with narrow rounded oblique ribs (about fourteen on the penultimate), more prominent medially, and attenuated at the sutures; also with spiral grooves, which are about as wide as the intervening flat threads (about eight on the penultimate); on

the last whorl the slender costæ stop short at the periphery. Pullus of smooth whorls.

This species is closely related to *R. trajectus*, Watson, but differs by more elongate shape, arched ribs, and rounded whorls; also to *R. Strangei*, Braz., which has closer and stronger ribs, fewer spiral striæ, and the shell short and stout.

Tasmania.

Rissoia (Apicularia) apicilirata, *spec. nov.*

Elongate-conic, thin, yellow-fawn, smooth, shining. Pullus hyaline, turbinate, two-whorled, ornamented with three, spiral, simple, relatively broad and high keels. Whorls three, slightly bicarinated, the posterior slope somewhat concave, the anterior slope steeper and shorter; ornamented by transverse slender ridges (about twenty on the penultimate), which are oblique on the posterior slope, vertical thence to the front suture; there is a spiral thread at the posterior suture, and a threadlet near the anterior rows; two spiral rows of small nodosities occupy the near middle-third of the whorl.

Periphery of last whorl with four riblets crossed by costulæ, and there are a few others on the base which gradually decrease in size.

Aperture oval; peristome entire, thin.

Length, 2·2; width, 9 mm.

D'Entrecasteaux Channel, Tasmania.

This species is unique in the section by reason of its ornate pullus.

Rissoia (Pusillina) discrepans, *spec. nov.*

Shell oval-conic, thin, greyish, pale rose-tinted at the apex.

Pullus somewhat hemispheric of two smooth whorls. Spire-whorls four, nearly flat, suture impressed; ornamented by numerous slender subacute axial ridges, interstices smooth. Last whorl subangulated, the axial costation evanescent towards the anterior part; an indistinct lineation is at the periphery, as also one above and one below, all in near contiguity; base finely striated radially.

Aperture oval, outer and inner lips thinly callously joined; outer lip thin (slightly varicosely dilated behind, front lip with a slight insinuosity—these features are probably the result of an injury during life). Columella slightly exsert, margining a linear umbilical chink.

Length, 3; width, 1·6 mm.

D'Entrecasteaux Channel, Tasmania.

The ornament and shape, in combination with the angulated base, distinguish this species from all figured species.

Rissoia (Amphithalamus) Simsoni, *spec. nov.*

Pupiform, strong, shining, white, tinted with pale-chestnut. Whorls four, flatly convex, sculptured with microscopic oblique striæ; suture linear. Apex hemisphæric of one and a-half whorls. Last whorl somewhat flattened on the ventral face. Aperture oval; peristome continuous, adnate to the parietal wall. Resembles *R. dissimilis* on a large scale.

Length, 4·5; width, 1·5 mm.

Species-name in compliment to our friend and co-worker, Mr. Auguste Simson of Launceston.

Derwent Estuary, Tasmania *(W. L. May);* also Port Fairy, Victoria *(Rev. T. Whan!).*

Rissoia (Cingula) rubicunda, *spec. nov.*

Shell minute, elevated conic, imperforate, moderately thick; varies in colour from pellucid-brown to opaque-white.

Pullus obtuse, of one and a-half turns. Spire-whorls four, moderately convex, widest near the anterior suture (some examples show a tendency to imbrication), smooth, and sculptured with growth-lines. Suture linear, distinct. Last whorl rather depressed at the suture, rounded at the periphery, a little contracted at the outer lip.

Aperture rotund, chestnut-coloured in the interior; peristome entire; outer lip thin; columella lip slightly exsert, margining a false umbilical chink.

Length, 2·5; width, 1·0 mm.

Derwent Estuary, Tasmania *(W. L. May);* many examples.

This may prove to belong to *Hydrobia*, when the animal has been studied.

R. perexigua, *nom mutand.*

Rissoia minutissima, Ten.-Woods, P.R.S. Tasm., 1878, p. 122 non *Rissoia minutissima*, Michelin, "Gen. Rissoia."

Rissoia (Nodulus) pellucida, *spec. nov.*

Shell minute, obliquely oval, somewhat stout, translucent-white, smooth, shining, imperforate. Pullus small, obtuse. Spire-whorls three and a-half, rapidly increasing, slantingly convex, without visible ornament or sculpture. Aperture roundly oval; peristome thick, continuous.

Length, 1·2; width, ·75 mm.

Frederick Henry Bay, Tasmania (*W. L. May*).

This species differs from other members of the section by its Littorina-like shape; however, the following species in Section Cingulina offer some comparisons:—It has the outline of *R. hyalina*, which possesses spiral raised striæ and delicate growth-lines, and it is more obliquely oval than *R. littorinæformis*.

Rissopsis buliminoides, *spec. nov.*

Shell small, cylindroid, thin, opaque-white. Whorls six, flatly convex, sculptured with faint axial striæ of growth; suture linear, but well-defined. Pullus hyaline, depressedly rounded, forming a small abrupt papillary summit, tip immersed. Aperture oval; peristome entire, the callous growth on the parietal wall somewhat explanulate; columella with a slight torsion over a minute umbilical chink.

Length, 4·25; breadth, 1·3 mm.

Federick Henry Bay, Tasmania, 10 fathoms, *W. L. May.*

Rissopsis consobrina, *spec. nov.*

Elongate, turreted, hyaline (in a fresh state), with rounded whorls and a deep suture, sculptured with curved growth-lines. Aperture elongate-oval, somewhat explanulate, columella-lip very thin and exsert.

Its turreted form, rounded whorls, and elongate-oval aperture distinguish it from *R. buliminoides.*

Length, 3·5; width, 1·0 mm.

Federick Henry Bay, Tasmania, common, *W. L. May.*

Cyclostrema porcellana, *spec. nov.*

Shell oval-conic, moderately stout, smooth, shining, opaque-white. Spire-whorls three and a-half, convex, sloping gently from the posterior one-third, more abruptly to the anterior suture, faintly marked by oblique striæ. Pullus of one and a-half whorls, translucent, depressedly convex. Periphery of last whorl roundly angulated. Aperture roundedly-oval, oblique; peristome incomplete; outer lip rather thin; columella slightly exsert, but not reflected over a minute umbilicus. Six examples.

Length, 1·8; breadth, 1·3 mm.

This species is more conic than such related forms of Tubiola as *C. australe*, *C. contabulatum*, and *C. micron.*

Frederick Henry Bay, Tasmania *(W. L. May).*

Zidora Lodderæ, *nom. mutand.*

Z. Tasmanica, Hedley, P.L.S., N.S. Wales, 1900, p. 93, three woodcuts; non Beddome, 1883.

This species is closely related to the Japanese *Z. reticulata;* and judging from Reeve's figure of that shell, the Tasmanian congener differs by relatively greater width.

The shell which Tate rightly attributed to Beddome's species, and described under the name of *Z. Legrandi*, T.R.S., S. Aust., XVIII., p. 118, 1894, differs from other known species by its apex situated far within the vertical plane of the posterior margin.

Tasmania *(Miss Lodder);* N.S. Wales (apud *Hedley).*

Nacella Tasmanica, *nom. mutand.*

N. parva, var. *Tasmanica*, Pilsbry, "Nautilus," 1895.

Frederick Henry Bay, Tasmania *(W. L. May).*

Cadulus (Gadilia) spretus, *spec. nov.*

Shell small, of medium proportion, well-curved, variegated (in some specimens) with translucent and opaque-white rings and encircling bands. Surface smooth, with fine obliquely annular grooves or lines, without traces of vertical striæ.

Apertures circular, transverse. Tube suddenly contracted quite near the oral aperture, but exhibits a slight dilatation at the end.

Shell most like *C. panamensis*, Sharp and Pilsbry, but seems to grow more rapidly, has greater breadth throughout, and is more curved.

Length of shell, 5·5; diameter of larger aperture, ·7; of the smaller aperture, ·3 mm.

Port Esperance, Tasmania, in 24 fathoms *(W. L. May).*

Cyamium mactroides, *spec. nov.*

Shell mactra-like, minute, equivalve, nearly equilateral, somewhat thick, smooth, and shining; of a whitish colour, and partially brown-tinted, moderately convex. Surface concentrically striated, obsoletely radially ridged, ventral and anterior margins crenulated within. Umbos small, approximate, slightly directed forwards, a little posterior. Dorsal line about equally inclined, the anterior margin curved, the posterior margin truncatedly rounded, ventral margin nearly straight.

Hinge-line arched and relatively deep. Left valve with a posterior marginal ligamental pit, in front of which is a central cardinal tooth with two strong equal divaricating branches, and an anterior oblique cardinal tooth. Right valve with two diverging cardinal teeth, the anterior one bifid at the tip.

Antero-posterior diameter, 2·05; umbo-ventral diameter, 1·8 mm.

Two pairs of valves, taken in life *(W. F. Petterd!).*

The reference of this little shell to *Cyamium* is because its dentition agrees with the emended description of the genus as implied by Bernard in Bull. Mus. Hist. Nat., 1897, p. 311.

Carditella delta, *spec. nov.*

Shell equilateral, subequivalve, trigonal, compressed with produced straight pointed umbones. The dorsal lines slope very rapidly from the umbones which are in contact; the post-dorsal margin slightly arched, the anterior-dorsal straight; the lunule and escutcheon occupy deep elliptical depressions, angulated on the margin. The ventral margin is arched, and is distantly crenulated within.

There is a thin brown epidermis; the ornament consists of concentric lines and a few distant growth-folds and obscure radial lines.

Umbo-ventral diam., 2·25; antero-posterior diam., 2; sectional diam., 1·25 mm.

Derwent Estuary, Tasmania (*W. L. May*).

Comes nearest to *C. polita*, Tate, an Eocene species, but is not produced anteriorly. It differs from *C. Atkinsoni* by its acutely trigonal outline, and is not so convex.

Carditella pectinata, *spec. nov.*

Triangularly oval, inequilateral, rather convex. Antero-dorsal margin straight and steeply inclined; post-dorsal margin convexly sloping to the narrow rounded posterior side; ventral margin slightly curved, distantly crenulated within.

Umbones obtuse, prominent, approximate, situated considerably in front of the centre.

Colour yellowish-brown. The ornament consists of numerous (fifteen or more) radial broad ridges (most conspicuous anteriorly), separated by linear sulci; and intersected by growth-lines.

Umbo-ventral diam., 1·5; antero-posterior diam., 1·5; sectional diam., 1 mm.

Derwent Estuary, Tasmania (*W. L. May*).

Genus Thraciopsis, *nom. mutand.*

Alicia, Angas, 1867, non Johnson, 1861.

Type :—*T. angustata*, Angas (sp.)

New South Wales, Tasmania, and South Australia.

On the Occurrence of Marine Fossiliferous Rocks at Kerguelen Island.

By Professor Ralph Tate.

[Read September 3, 1900.]

Plates II.—III.

Introduction.

Kerguelen Island was discovered in 1772 by the commander of a French vessel—Ives Julian de Kerguelen Tremaric. A little later it was visited by Captain Cook. Since then it has been visited by four scientific expeditions, the first under the command of Sir James Ross in 1840; the second, that of the Challenger Expedition in 1874, and the two Transit of Venus Expeditions, 1874-75, one British, the other United States of America.

The island is in about 49° South latitude, is 100 miles long, and about 50 miles wide, and is about 3,500 miles S.E. from the Cape of Good Hope, and 3,000 miles from the extreme west coast of Australia.

Ross says of it, that it is one of the most barren spots on the earth at the same distance from the pole. One of the names by which it has been known to geographers is very appropriate—Desolation Island, which was given to it by Captain Cook. Sir Joseph Hooker describes it:—"The island presented a black and rugged mass of sterile mountains, rising by parallel steppes one above another in alternate slopes and precipices, terminating in frightful naked and frowning cliffs, which dip perpendicularly into the sea. The snow lying upon these slopes between the black cliffs gives a most singularly striped and banded appearance to the whole country, each band indicating a flow of volcanic matter, for the island is covered with craters, whose vents have given issue to stream upon stream of molten rock. These were worn all along the coast into abrupt escarpments, rendering a landing impracticable, except at the heads of the sinuous bays."

Kerguelen Island was visited in 1898 by Mr. Robert Hall, of Melbourne, and his collections of lichens, algæ, fungi, and rocks, which have been described by experts in the "Victorian Naturalist, vols. XV. and XVI.," have supplemented previous knowledge in the several departments. But these discoveries are vastly transcended by that relating to the presence of marine

fossiliferous strata; almost unique as regards high Southern lands.

My reading-acquaintance with the geology of the land-masses in high southern latitudes may be for the most part summarised in the following words of Captain Hutton, F.R.S., "On the Origin of the Fauna and Flora of New Zealand," Presidential Address, Phil. Inst., Canterbury, 1884:—"From what is known of the geology of the Antarctic Islands, it appears that all are volcanic, except South Georgia, which is part of an old slate-mountain range." Nevertheless, Captain Hutton has overlooked the observations of Dr. Kidder, which indicate the occurrence of stratified deposits in Kerguelen Island; who remarks in his "Contributions to the Natural History of Kerguelen Island made in 1874-75," Bull, U.S. Nat. Mus., 1876:—"The main rocks are basalt and dolerite. The streams had cut their way deeply in places, exposing extensive surfaces of rock, but diligent search failed to disclose any stratified or fossiliferous beds" in the southern part of Kerguelen Island. "At the northern end of the island, however, in the neighbourhood of Christmas Harbor, stratified rocks are abundant, with extensive deposits of coal of poor quality, and contain many trunks of petrified trees," p. 34.

Position, Nature, and Fossil-contents of the Marine Deposit.

From Mr. Hall's field-notes and sketches the position of the fossil development occupies a depression on the west side of the peak known as Cat's Ears; it is squeezed in between eruptive masses at a steep slope, and attains to an elevation of 826 feet. The stratum seems as if it had been upthrusted from its horizontal position by the eruption of the volcanic mass which is crowned by Cat's Ears.

The rock is a fine-grained friable sandstone of a grey colour, somewhat dappled with rust-coloured grains. About 50 lbs. weight of the rock was submitted to it; it is richly prolific in fossils, constituting for the most part a lumachelle. However, the number of species is only fourteen, the Chiones and Turritella being the only ones occurring abundantly. They consist of Natica one sp., Turritella one, Chione three, Gari one, Mytilus two, Polyzoa two (impressions on the casts of *Chione*), Balanus one, Spirorbis one (2.25 mm. diam., whorls $2\frac{1}{2}$), Serpula two (one fasciculated, tubes 2.5 mm. diam, the other solitary, long, and vermiculate).

The facies of the fauna is Tertiary, and may belong to any part of it, because, as regards the well-defined species of mollusca, not one is referable to living creation—certainly not in reference to

the existing fauna of Kerguelen Island and other similar Southern positions. The *Turritella* resembles *T. Hookeri* from the Antarctic, without locality; the *Natica* has no near analogue, and the genera *Chione* and *Gari* are not represented in high Southern latitudes; nevertheless, it is not improbable that the two species of *Mytilus* may belong to recent species.

The fauna indicates nothing specialised, except that of distinctness of species, to separate it from that of a modern deposit; and in the absence of distinctive genera of Palæogene age, I must refer the deposit to Neogene without any subordinate assignment.

Notes on the Fossils.

Natica Tremarici, *spec. nov.* Pl. ii., figs. 4*a*-4*c*.

Shell depressedly hemispheric; whorls four and a half, marked with growth-lines, but without spiral sculpture. Aperture lunate. Umbilicus wide; a small callus is reflected over the upper portion of the umbilicus.

In shape this fossil species is like the recent *N. ampla* and *N. Incei* of the same size, but the spire is obtuse and less elevated than in *N. Incei*, more elevated than in *N. ampla*, and regularly convex below the suture; the umbilicus is somewhat similar to that of *N. ampla*.

Diameters, 19 and 12; height, 10 mm.

Turritella Hallii, *spec. nov.* Pl. ii., figs. 3*a*-3*b*.

Shell broadly conical, a little rounded at the basal angle and on the base. Apex not known. Whorls ten, biangulated, much constricted below, and more gradually contracted above.

The ornament consists of two strong keels, one at each margin of the side, dividing each whorl into three approximately equal widths; the space between the keels is flattish or slightly concave. In addition there are fine spiral threads, usually alternaternately large and small, six on the intercarinal space, and six on each of the sutural slopes.

Aperture quadrately oval, higher than it is broad; outer lip not preserved, though there are traces on the anterior part of the last whorl of curved growth lines, indicating a broad shallow sinus; columella somewhat arched and thickened (not dilated at the front).

Length, 39; breadth, 12·5; height of last whorl, 12 mm.

Among the few bicarinate species of the genus it makes some approach to *T. ambulacrum*, Sow., Tertiary in Patagonia and Chatham Islands, which has the whorls not so quadrate, and the encircling ribs are of unequal size. It simulates *T. Hookeri*, Reeve, an Antarctic species, but, judging by the figure, it is

narrower, with more numerous whorls. No details of ornament accompany the diagnosis. *T. australina*, Watson, from Kerguelen, is somewhat broader, the whorls more numerous, not so quadrate, and the two carinating liræ not equally disposed.

Chione permagna, *spec. nov.* Pl. ii., fig. 1.

Shell triangularly oval, very thick, somewhat heart-shaped, very inequilateral, depressedly convex. Umbones large, depressed, situated in about the anterior one-fourth.

Post-dorsal margin arched, gradually merging into the obliquely subtruncated posterior margin; post-ventral margin nearly straight, rapidly incurving to the rounded anterior margin; antero-dorsal margin cordately curved; inner margin of valve quite entire. Lunule broadly elliptic, shallow, its margins angulated.

Ornamentation of crowded depressed growth-ridges and lines, not raised into lamellæ; and on the dorsal-half by rounded radial threads with equidistant interstitial furrows, about thirty in a width of ten millimetres.

Antero-posterior diameter, 86; umbo-ventral diam., 79; sectional diam., 40. A larger and more orbicular example has ant.-post. diam., 95; umbo-ventral diam., 88.

This large ponderous shell is probably the largest in the genus, hence its specific name; it is distinguishable by its obliquely orbicular outline.

Chione Hallii, *spec. nov.* Plate ii., fig. 5.

Shell oblong-oval, moderately convex, somewhat thick, inequilateral; concentrically grooved, the depressed rounded intervening folds about two times as wide as the grooves, which are somewhat variable in width, from 16 to 20 in a width of ten millimetres near the ventral margin. Internal margin of valves quite entire.

Antero-posterior diameter, 47; umbo-ventral diam., 38; sectional diam., 21 mm.

Most like *C. tristis*, Lamk., but the anterior side is more developed, more cordate, the post-dorsal margin more arched, and the concentric folds narrower and more numerous.

Chione Kergueleni, *spec. nov.* Pl. ii., fig. 2.

Oval-cordate, subventricose. Post-dorsal margin regularly convex; ventral margin slightly curved, rising rapidly to the anterior margin; interior margin quite entire.

Ornamented with depressed concentric ridges, separated by narrow deep sulci; about eight ridges in a width of ten millimetres at the front (but the various examples show considerable variation in the number of the growth-ridges); faintly radiately and densely striated at least on the sub-surface shell-layer.

Antero - posterior diameter, 57 ; umbo-ventral diam., 48 ; sectional diam., 32 mm.

This species differs from *C. Hallii* by its regularly convex dorsal margin and its wide concentric ridges.

Gari ? *sp.*

The collection contains a single example of a member of the family Psammobiidæ, as inferred fram its shape and the presence of a ligamental plate, but as the antero-dorsal area is wanting the generic location cannot be fixed. Left valve very flattened, the ventral margin nearly straight, somewhat pointed posteriorly.

Antero-posterior diameter, 50 ; dorso-ventral diam., 25 mm.

It does not agree with any described recent species of the family, though it approaches to *Solenotellina siliqua*, Reeve, inhabiting New Zealand.

Mytilus, *sp.* (aff. *M. planulatus*).

Shell elongately oval, solid, somewhat angularly attenuated towards the umbo, which is bent downwards, transversely moderately convex. (Smooth with low concentric growth-folds.) Anterior margin straight, dorsal margin uninterruptly arched, ventral margin.

Length (incomplete), 95 mm.; greatest width medially, 65 mm. (One imperfect valve, much decorticated).

This fossil is distinct from *M. planulatus*, Lamarck, and *M. latus*, Chemnitz, by its uniformly curved dorsal margin ; being unable to make a comparative study with *M. chorus*, I avoid applying a distinctive denomination.

Mytilus, *sp.* (aff. *M. Magellanicus*).

A mould of a radially sculptured mussel is suggestive of *M. Magellanicus*, but the fine regular radiating ridges indicate some other reference.

EXPLANATIONS TO PLATES.

Plate II.

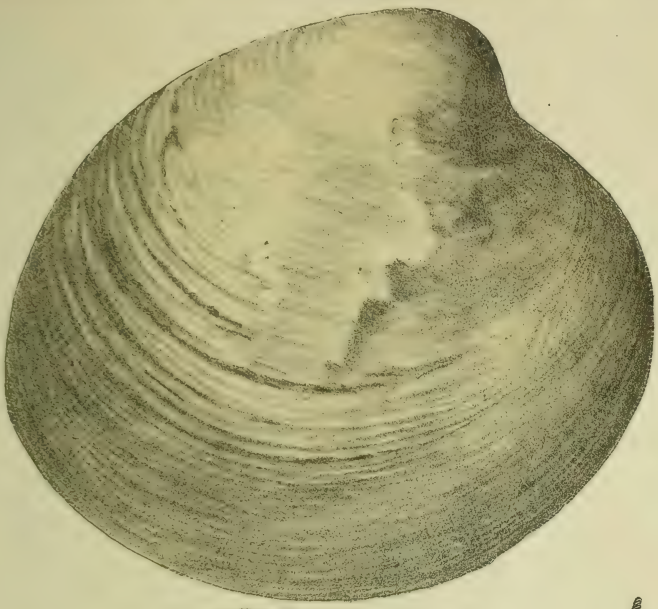
Fig.

1. *Chione permagna.* Nat. size.
2. *Chione Kerguelini.* Nat. size.
3. *Turritella Hallii.* *a*, Nat. size ; *b*, sectional portion of a whorl, enlarged.
4. *Natica Tremarici.* Sectional three views, slightly enlarged—*a*, from above ; *b*, frontal side ; *c*, base.
5. *Chione Hallii.* Nat. size.

Plate III.

Cat's Ears, looking south-east from Long Island, near entrance to Royal Sound. (A sketch by Mr. R. Hall, 4-1-98).

1. Cat's Ears.
2. Fossil bed.
3. Heavy masses of rock.
4. Lava much contracted and distorted.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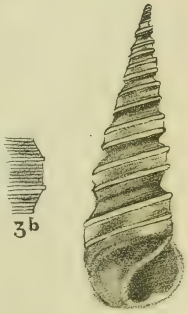
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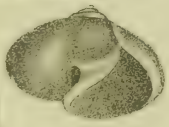
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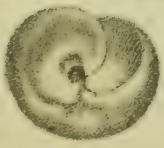
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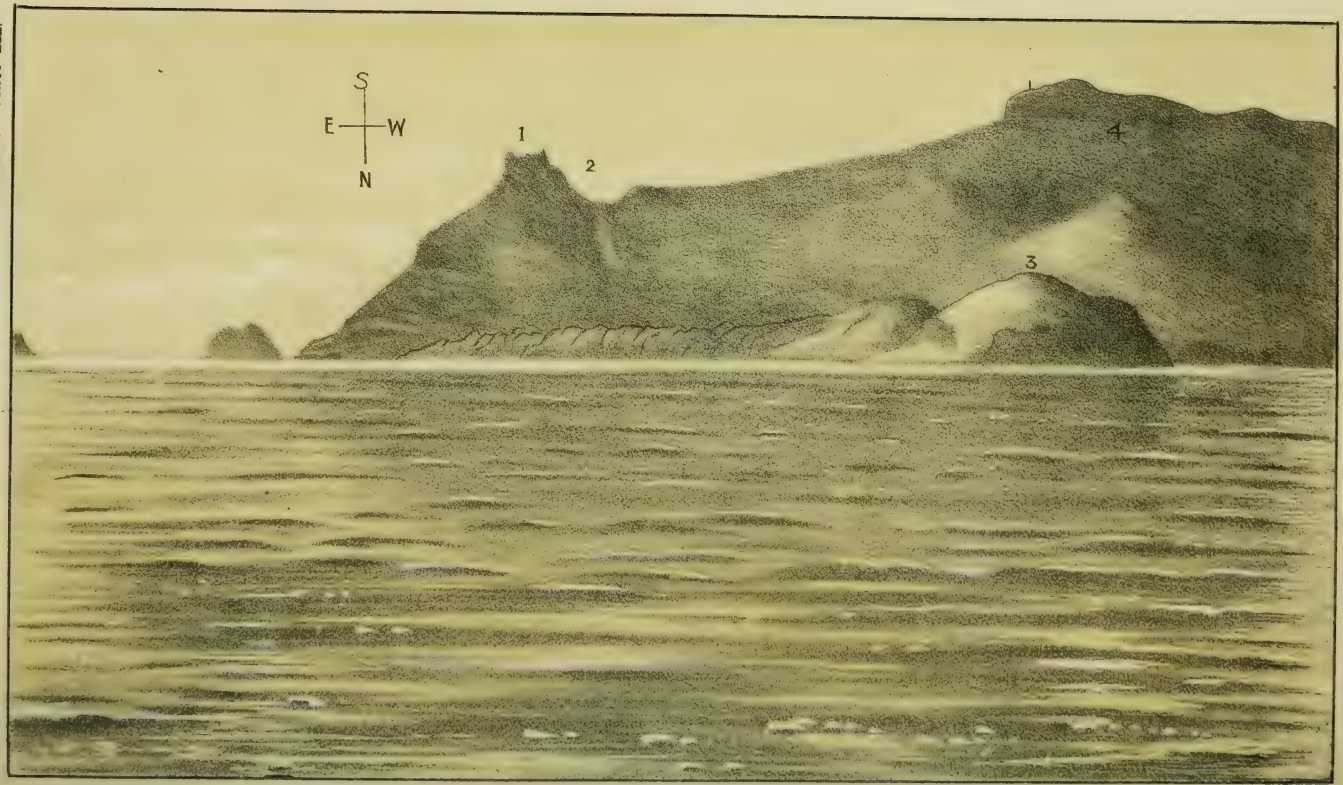
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Section of a Well-bore at Mulgundawa, near Wellington, South Australia.

By Professor Ralph Tate.

[Read September 3, 1900.]

In the latter part of 1899 Dr. Stirling, on behalf of Mr. Knight, of Mulgundawa, handed me some siftings of certain fossil-developments obtained from a well-boring (the further sinking of which had to be abandoned), with the view to an opinion as to the probability of reaching water at no inconsiderable depth, if a second venture should be decided on.

Well No. 1 was sunk to a depth of 214 feet. At 213 feet a shell-bed, rich in fossils, was penetrated. The fosssils are mainly identical with those of the chief fossil-bed in the Kent Town bore, and with those from 380 to 424 feet (=312 to 356 above sea-level) at the Ki-Ki bore, in the Ninety-Mile Desert.

The Mulgundawa bore is about ten miles west from Wellington, near the lake-mouth of the Murray River, and one and a half miles from the shore of Lake Alexandrina. Its elevation above sea-level has not been ascertained, but it is not likely to exceed 20 or 30 feet. It is situated about 40 miles N.W. from Ki-Ki, which yielded water at 312 feet below sea-level.* There is great similarity in the beds yielding water in the Ninety-Mile Desert, which agree with those at Mulgundawa—a contemporaneity which is proved by identity of fossil-contents. This led me to express the opinion that water would be found at a depth below 214 feet; and making allowance that the Eocene beds were rising in their westerly extension, I assigned a less depth to reach water than obtained at Ki-Ki.

Bore No. 2 was sunk close to the site of No. 1, and in a letter, dated July 14, 1900, Mr. John S. Knight advises that "At a depth of 292 feet we struck water, which rose to, and is still flowing, from the casing within 3 feet 6 inches of the surface; consider it middling stock water." Thus has been demonstrated the feasibility of an economic application of a detailed knowledge of the actual similitudes of fossiliferous horizons. An increase of like results may lead to the determination of the actual source of water supply contained in the basal beds of the Eocene in the vast area of country extending eastward from the

* See Clark, Trans. Roy Soc., S. Aust, XX., 1896, p. 112.

River Murray into the mallee lands of N.W. Victoria. The quality of the water has not altogether been unsuspected, and it is clear from the position of Mulgundawa that the water is impounded, and in consequence has acquired an accession of mineral ingredients; but it is not improbable that, in course of time, some sensible diminution in the percentage value of its salts will result.

BORE-SECTION AT MULGUNDAWA.

FEET.

30-40. Fine yellow sand, with fragments of oyster; pectens and spines of *Cidaris*.

43. Greyish-yellow fine-grained calciferous sand, with calciferous sandstone pellets. *Isis* sp. and Polyzoa.

60-69. Similar to 43. *Terebratulina catinuliformis*, *Isis* sp., *Scutellina patella*, *Fibularia gregata*, Polyzoa.

75. Same as 43. Shell fragments very rare.

84-93. Same as 60-69. Fossil-debris rare. *Scutellina patella* and other Echinoderms, Graphularia, *Dimya dissimilis*.

97-98. Grey, extremely calciferous sand, and slightly argillaceous. No fossils.

100-107. Same as 60-69. *Terebratulina catinuliformis*.

160-164. Greenish-grey, very fine-grained, calciferous sand. *Terebratulina catinuliformis*.

175. Yellowish-grey, calciferous, sandrock.

180-186. Bluish-grey, clayey sand, very fine, and slightly calcareous. No fossils.

188-200. Grey calciferous sand and sandrock. No fossils.

202-206. Mottled grey-brown sandy clay. Chief source of the fossils.

207-208. Very stiff brown-black clay.

209. Brown clayey sand.

216-226. (From seven levels.) Very stiff brown-black clay.

230-232. Brown clayey sand.

238. Light brown clayey sand.

246-250. Stiff black clay.

254-260. Black and grey clays.

264. Brown clayey sand.

265. Brown sharp sand, with much comminuted shell-debris; the fossils corroded and eroded; small splinters of carbonised wood, freely diffused.

285. Grey calciferous sand, with shell-debris.

292. Greyish-white sand, very fine-grained; the coarser residue of translucent sub-angular quartz grains up to 5 mm. diameter; fossiliferous, and splinters of carbonised wood.

Eocene Fossils from Mulgundawa-bore.*

Lamna, sp.
Otodus, sp.
Otolithes
Fusus, n.sp., aff. sculptilis
Lampusia oligostira
Marginella sub-Wentworthi
Uromitra, n.sp., aff. subcrenularis
Asthenotoma, n.sp.
Natica Aldingæ
Natica polita
Turritella Aldingæ
Mesalia stylacris
Newtoniella, n.sp.
Solariella, n.sp.
Minolia, n.sp.
Calliostoma, sp.
Bullinella, n.sp., aff. aratula
Scaphander tenuis (?)
Dentalium Mantelli
Dentalium subfissura
Anomia (?) sp.
Dimya dissimilis
Pecten Foulcheri (?)
Amussium Zittelli
Crenella globularis
Septifer, n.sp., aff. fenestratus
Nucula Tenisoni
Leda apiculata
Leda Huttoni
Leda leptorhyncha
Axinæa Cainozoica
Limopsis insolita, var.
Limopsis, n.sp.
Barbatia celloporacea
Barbatia limatella
Barbatia, sp.
Trigonia semi-undulata
Crassatella communis, var.
Cardita, n.sp.
Carditella, n.sp., aff. polita
Verticordia, n.sp., aff. rhomboidea
Lucina despectans
Chione Cainozoica
Meretrix tenuis
Dosinia imparistriata
Tellina porrecta
Tellina, n.sp.
Mactra, n.sp., aff. Hamiltonensis
Myadora lamellata
Myadora, n.sp., aff. prælonga
Corbula pyxidata
Terebratulina catinuliformis
Magasella lunata
Selenaria
Lunulites and many other Polyzoa
Ditrupa
Serpula
Cidaris, sp. (spines)
Echinus Woodsii (?)
Monostychia australis (?)
Scutellina patella
Fibularia gregata
Astrogonium sp.
Pentacrinus
Comatula sp.
Graphularia senescens (?)
Isis, sp.
Flabellum pistinctum
Flabellum dedicellare
Placotrochus deltoideus
Notocyathus viola
Notocyathus excisus
Notocyathus punctatus
Notocyathus, n.sp.
Deltocyathus italicus
Deltocyathus, sp.

* The fragmentary condition of the fossils does not permit in many instances of a satisfactory specific assignment. The corals were determined by Mr. J. Dennant.

Description of a New Species of Acanthiza (*A. tenuirostris*).

By A. Zietz, F.L.S., C.M.Z.S., Assistant-Director of the S.A. Museum.

[Read November 6, 1900.]

This new species is nearest allied to *Acanthiza reguloides*. Its more diminutive size, its feeble bill, the different shade of the rump feathers, and the absence of the bright rufous colouring of the basal third of the tail feathers, distinguish it from *Acanthiza reguloides*, which, according to Gould, is a fairly common species about Adelaide.

Two specimens have been collected by R. M. Hawker, Esq., at Leigh Creek, in August, 1895.

I propose for this new species the name *Acanthiza tenuirostris* (the small-billed Tit).

With the general characters of *A.* (*Geobasileus*) *reguloides*. Upper surface of a more greyish tinge instead of olive brown. The feathers on the forehead are much darker and broadly margined with white. Upper tail coverts of a yellowish white tinge; in *A. reguloides* they are ochreous. Under surface whitish and slightly tinged with yellow. Throat and chest still paler, each feather with a very slight broken margin of brown. Base of tail only with a faint, just perceptible, rufous tinge. The external margin of the centre tail feathers, and the tips of all greyish. Upper tail coverts whitish, slightly shaded with fawn.

For comparison I give the measurements of *A. reguloides* from the hills east of Adelaide, together with those of the new bird.

	A. tenuirostris.	*A. reguloides.*
Total length ...	3·5 inches	4 inches
Length of wing ...	1·9 "	2 "
Length of culmen...	·3 "	·4 "
Height of bill ...	·1 "	·12 "

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

XXVII.

[Read October 2, 1900.]

LAMELLICORNES.

HETERONYX.

H. grandis, sp. nov. Robustus, elongato-ovatus; postice manifeste dilatatus; minus nitidus; piceo-ferrugineus, antennis pedibusque paullo dilutioribus; pilis cinereis subtilibus sat elongatis sat crebre vestitus; capite (clypeo incluso) sat grosse ruguloso; prothorace aspere subtiliter confertim, elytris sat crebre minus subtiliter, pygidio fere ut elytra sed magis leviter, punctulatis; clypeo antice late leviter rotundato, sutura clypeali bene determinata, angulata; pronoto quam longiori ut 5 ad 3 latiori, lateribus leviter arcuatis, basi modice bisinuata, angulis anticis acutis sat productis posticis obtusis; elytris obsoletissime interrupte substriatis; tibiis anticis extus obtuse tridentatis; labro longe sub clypeum sito; antennis 9-articulatis; coxis posticis ad latera quam metasternum parum brevioribus, quam segmentum ventrale 2um multo longioribus; tarsis posticis minus elongatis, articulo 2° quam 1us manifeste longiori; unguiculis appendiculatis, parte apicali quam basalis parum breviori. Long., 8 l.; lat., 4 l.

This remarkably fine *Heteronyx* is near *piceus*, Blanch. In my tabulation of the species of that group (P.L.S., N.S.W., 1892, pp. 488-9) it must be placed next after *alpicola*, Blackb., as follows:—

HHHH. Sculpture of pronotum very much finer and closer than of head and elytra ... ... *grandis*, Blackb.

The elytra of this species are not truly striate, but their surface is slightly (scarcely visibly) uneven owing to the presence of faint longitudinal wide elevations, the margins of which, from a certain point of view, give the elytra a scarcely noticeable quasi-striate appearance.

Victoria; Dividing Range (unique in my collection).

ELATERIDÆ.

CHROSIS.

C. angusticollis, sp. nov. (Mas). Angusta; valde elongata; ferruginea, prothorace coccineo (in medio nigricanti), capite antennisque nigris, pedibus piceis; capite sparsim fortiter punctulato, pilis albidis sat elongatis sparsim vestito; prothorace quam ad basin latiori vix (quam ad medium latiori ut 10 ad 7) longiori, supra longitudinaliter profunde trisulcato, ut caput pubescenti, sparsim subtiliter (ad latera magis crebre magis grosse) punctulato, antice fere truncato, lateribus sat parallelis, angulis posticis fortiter divaricatis; elytris breviter (apicem versus magis longe) pubescentibus, ad apicem oblique subtruncatis, sat fortiter striatis, interstitiis leviter convexis punctulatis. Long., 8 l.; lat., 2 l. (vix).

Allied to *C. trisulcatus*, Er., but extremely distinct by, *inter alia multa*, the very much sparser puncturation of its head and prothorax and the narrower and more parallel form, and the more abruptly divaricate hind angles of the latter. The antennæ considerably passing the base of the prothorax indicate the specimen before me to be a male.

Victoria (Dividing Range).

PARASAPHES.

P. quinquesulcatus, sp. nov. Angustus; valde elongatus; ferrugineus, capite antennis et prothoracis vittis 2 nigricantibus, femoribus infuscatis; capite crebre subfortiter punctulato, pilis albidis sat elongatis vestito; prothorace quam ad basin latiori ut 10 ad 8 (quam ad medium latiori ut 10 ad 7) longiori, supra longitudinaliter sat profunde 5-sulcato, in partibus medianis elevatis glabro sparsim subfortiter punctulato, alibi ut caput pubescenti confertim subtiliter (latera versus magis grosse) punctulato, antice subtruncato, lateribus fere rectis, angulis posticis haud divaricatis; elytris breviter pubescentibus, ad apicem valde acuminatis, sat fortiter striatis, interstitiis leviter convexis punctulatis. Long., 7 l.; lat., $1\frac{1}{2}$ l.

There seems to be no doubt that this species and the following should be associated generically with that for which Dr. Candèze proposed the name *Parasaphes*. They bear a remarkable general resemblance to *Chrosis*, but differ from it in respect of important structural characters,—notably their very much shorter head and the widely different form of their mesosternum and tarsi. The former is (not horizontal but) strongly declivous; and the latter have their basal joint very elongate, the 2nd scarcely half as long as the basal one and slightly dilated; the 3rd still shorter,

more strongly dilated and sublamellate ; the 4th extremely small (little more than a nodule) ; the 5th about the same length as the preceding 3 together. I have before me specimens of an insect that seems certainly to be Candèze's typical species of the genus (*P. elegans*), but it is from Tasmania (my own capture) not Queensland (Candèze's locality.) There are thus known to me three species of the genus, *P. elegans* being distinguishable from the other two by, *inter alia*, the much less acuminate apices of its elytra, and *P. quinquesulcatus* from the other two by, *inter alia*, the non-divaricate hind angles of its prothorax. In all three the carina within the hind angle of the pronotum is very strongly defined and continued more or less distinctly to, or even beyond, the middle of the pronotum. My specimen of *P. quinquesulcatus* is probably a female, as the antennæ scarcely pass the base of the prothorax.

Victoria (Dividing Range).

P. bicolor, sp. nov. Angustus ; valde elongatus ; niger, pronoti sulco mediano lateribusque et prosterni lateribus rufis ; capite crebre subfortiter punctulato, pilis albidis sat elongatis vestito ; prothorace quam ad basin latiori ut 7 ad 6 (quam ad medium latiori ut 7 ad 5) longiori, supra longitudinaliter sat profunde 5-sulcato, in partibus medianis elevatis glabro sparsim subfortiter punctulato, alibi ut caput pubescenti, confertim subtiliter (latera versus magis grosse) punctulato, antice subtruncato, lateribus leviter arcuatis, angulis posticis divaricatis ; elytris breviter pubescentibus, ad apicem valde acuminatis, sat fortiter striatis, interstitiis punctulatis leviter convexis.

Maris antennis prothoracis basin longe, feminæ parum, superantibus. Long., $5\frac{3}{4}$—$6\frac{1}{2}$ l.; lat., $1\frac{1}{5}$—$1\frac{1}{2}$ l.

Victoria (Dividing Range).

MALACODERMIDÆ.

SELENURUS.

S. fernshawensis, sp. nov. Elongatus ; capite nigro, antice flavo-notato, mandibulis plus minusve luteis, antennis palpisque nigro-piceis ; prothorace luteo, macula magna discoidali nigra ornato, hac antice margines laterales attingenti, postice bifida ; elytris viridibus ante apicem macula suturali flava ornatis ; corpore subtus nigro, flavo-maculato ; pedibus piceis ; capite prothoraceque lævibus ; hoc subquadrato postice paullo angustato, margine antico late rotundato, angulis subrotundatis ; elytris crebre rugulose punctulatis, quam abdomen multo brevioribus, ad apicem dehiscentibus. Long., 4—5 l.; lat., $\frac{4}{5}$—1 l.

" Congeneric with a species I described in Tr.R.S., S.A., 1892, pp. 220-221, but referred to *Selenurus* subject to the doubt I have already expressed *(loc. cit)*.

Victoria (Fernshaw).

TELEPHORUS.

T. pulchellus, Macl. var. (?) *notophilus*. I have before me two specimens belonging to the S.A. Museum, which appear to be a remarkable variety of *T. pulchellus*. They differ from the type in having a wide very conspicuous and sharply limited yellow fascia on the elytra a little behind the middle. I can, however, find no other difference. I have seen hundreds of specimens of *T. pulchellus*, but never one (except these) in which the elytra were not unicolorous. The specimens before me are from Carrieton (South Australia) and are male and female.

CLERIDÆ.

The Australian *Cleridæ* are much in need of revision, such descriptions as have been published being scattered through a great variety of (chiefly non-Australian) works, and many of them still standing as referred to genera with which they have nothing to do. The following notes are a contribution to the task of reducing them to order.

I am not aware of the existence of any memoir showing the relation to each other of the various genera among which the Australian *Cleridæ* are distributed, except Lacordaire's "Genera des Coléoptères," where such of the Australian genera as were known forty-three years ago find a place among the *Clerid* genera of the world, and some memoirs by the Rev. H. S. Gorham dealing with such as were known of them in certain groups of the *Cleridæ* twenty-four years ago, where again they are placed among the *Cleridæ* of the world belonging to those groups. I have, therefore, considered it desirable to provide a tabulated statement of the characters distinguishing the genera to which the known Australian *Cleridæ* can be referred for the use of students in Australia.

Herr Lohde has recently published a catalogue of the *Cleridæ* of the world, which is of the highest possible value, and includes nearly all the corrections that have been made in the generic position of the Australian species, but as a large part of the erroneous generic determinations of the earlier describers have never been corrected in any published treatise those determinations are still, of course, uncorrected in this recent catalogue. As far as possible I have corrected these in the following pages.

I begin with a tabulation of the characters of the *Clerid* genera known to occur in Australia, and then furnish more particular notes concerning some of those genera, together with the diag-

nosis of two new genera, descriptions of some new species, and a revision of one genus (Aulicus).

Tabulation of Australian *Clerid* genera :—

A. Eyes more or less emarginate.
  B. All the tarsi (viewed from above) distinctly 5-jointed.
    C. Head elongate, parallel ... ... Cylidrus.
    CC. Head oval ... ... Tillus.
  BB. Genera not having all the tarsi (viewed from above) distinctly 5-jointed.
    C. The front tarsi (viewed from above) distinctly 5-jointed.
      D. Eyes strongly emarginate.
        E. Space between the eyes considerably wider than diameter of part of eye visible from in front.
          F. Club of antennæ lax and long ... Clerus.
          FF. Club of antennæ abrupt and comparatively short ... ... Eleale.
        EE. Space between eyes equal to diameter of part of eye visible from in front ... Stigmatium.
        EEE. Space between eyes much narrower than diameter of part of eye visible from in front ... ... Omadius.
      DD. Eyes scarcely emarginate ... ... Orthrius
    CC. The front tarsi viewed from above appear to have only 4 joints.
      D. The appearance (from above) of the tarsi having only 4 joints arises from the basal joint being concealed under the second.
        E. The eyes very coarsely granulate.
          F. The apical joint of the maxillary palpi securiform ... ... Opilo.
          FF. The apical joint of the maxillary palpi elongate subtriangular.
            G. Body winged ... ... Natalis.
            GG. Body apterous ... ... Cormodes.
        EE. The eyes much more finely granulate.
          F. The apical joint of the maxillary palpi not securiform.
            G. Club of antennæ gradual and very feeble ... ... Metabasis.
            GG. Club of antennæ abrupt and strong Cleromorpha.
          FF. The apical joint of the maxillary palpi more or less strongly securiform.
            G. Mesosternum vertical in front ... Zenithicola.
            GG. Mesosternum not vertical in front.
              H. Elytra with conspicuous basal fascicles ... ... Trogodendron.
              HH. Elytra with large basal tubercles Olesterus.
              HHH. Elytra at base even (or nearly so).
                I. Pronotum with a conspicuous ante median transverse sulcus.
                  J. Elytra not more than twice as long as (at their base) wide Aulicus.
                  JJ. Elytra much more than twice as long as (at their base) wide.

K. The whole surface of the elytra coarsely rugulose; head elongate ... ... Scrobiger.
KK. Apical one-third or more of elytra smooth; head short ... ... Neoscrobiger.
II. Pronotum not having an antemedian sulcus.
J. Hind tarsi much longer and narrower than front tarsi ... Tarsostenus.
JJ. All the tarsi very similar *inter se* ... ... Tarsostenodes.
DD. The appearance (from above) of the tarsi having only 4 joints arises from the 4th joint being a mere nodule.
E. Antennal club composed of 8 serrate joints ... ... Tenerus.
EE. Antennal club composed of not more than 4 joints.
F. Apical joint of maxillary palpi strongly securiform ... ... Thanasimomorpha.
FF. Apical joint of maxillary palpi not (or scarcely) securiform.
G. Eyes very strongly granulate ... Pylus.
GG. Eyes much less strongly granulate.
H. Antennal club abrupt and strong.
I. Pronotum much expanded laterally but scarcely margined ... Parapylus.
II. Pronotum conspicuously margined laterally.
J. Apical joint of maxillary palpi elongate-triangular ... Corynetes.
JJ. Apical joint of maxillary palpi oval ... ... Necrobia.
HH. Antennal club elongate narrow and feebly defined .. .. Crobenia.
CCC. The front tarsi (viewed from above) appear to have only 3 joints ... ... Paratillus.
AA. Eyes entire.
B. Elytra wider at their base than the base of the prothorax ... ... Lemidia.
BB. Elytra not wider at their base than the base of the prothorax ... ... Allelidia.

TILLUS.

The only Australian species that stand in this genus in Catalogues (Lohde's included) are *hilaris*, Westw., and *dux*, Westw. The former of these is stated by Gorham (Cist. Ent., II., p. 62) to be congeneric with *Tillus bipartitus*, Blanch., and greatly to resemble it, but not to be a *Tillus*. *T. bipartitus* is the type of my genus *Thanasimomorpha* (my identification of *T. bipartitus* was confirmed by Dr. Sharp). I have before me a small *Clerid* from Victoria which agrees well with Westwood's description of *T. hilaris* (a Tasmanian species) in every respect except in being a trifle small and having its tibiæ and tarsi infuscate. It differs

from *T. bipartitus* considerably in the sculpture of its pronotum but otherwise its structural characters seem identical,—granulation and shape of eyes, length and structure of antennæ, structure of palpi, &c. Like *T. bipartitus* it seems to have only four tarsal joints even under a strong power, and it is not easy to feel quite certain which is the missing fifth joint, but I am fairly confident that it is the penultimate which is abnormal, and exists only as a minute nodule at the base of the apical joint. I have no doubt that the specimen before me either is *T. hilaris* or is excessively close to it, and that *T. hilaris* is a *Thanasimomorpha*, but whatever it is, it is not a *Tillus*.

T. dux, Westw., is a complete enigma. I incline to the opinion that its author was mistaken in calling its claws appendiculate, in which case it might well be a large *Natalis*, but if he was not mistaken I can make no suggestion about it except in saying that the description, and especially the size, do not suggest a true *Tillus*. I am therefore of opinion that there is no true *Tillus* known in Australia. It certainly seems unlikely that among all the Australian *Cleridæ* before Mr. Westwood there was not a *Natalis* but that there was a specimen, of the remarkably large size of a *Natalis*, subsequently (so far as I can discover) not mentioned by any author, and appertaining to a different genus.

OPILO.

To this genus nine Australian species are attributed in Masters' Catalogue; in Lohde's Cat. they stand at the same number but are not the same insects, *O.* (*Notoxus*) *ephippium*, Boisd., and *mœrens*, Westw., having been removed, the former (vide Tr. Roy. Soc., 1891, p. 303) having been shown to be a *Trogodendron* and the latter having been referred (I think wrongly,—vide infra) by Chevrolat to *Scrobiger*. Their places are filled by *O. variipes*, Chevr. (apparently omitted accidentally by Masters) and *O. floccosus*, Schenk., on which a note will be found below. A change of name also occurs, *Whitei*, Gorh., being substituted for *apicalis*, White (nom. præocc.), a synonym that appears to have escaped Mr. Masters' notice.

Concerning the species referred to *Opilo* in Lohde's Catalogue I offer the following notes:—

O. congruus, Newm. A true *Opilo;* very variable and common all over Australia.

O. eburneocinctus, Gorh. Not known to me. Probably a true *Opilo*.

O. ephippiger, White. Identical with *Trogodendron* (*Notoxus*) *ephippium*, Boisd., as pointed out by me (Tr. Roy. Soc., S.A., 1891, p. 303). Herr Lohde does not appear to have observed my note.

O. floccosus, Schenkl. I have in my collection a *Clerid* which agrees with Herr Schenkling's description of this species in every respect except that it has the palpi of a *Natalis* and should be referred to that genus. As Schenkling states that *floccosus* has the palpi of an *Opilo* I am compelled to suppose that the insect before me is not his species in spite of its agreement in other respects with his excellent description. I shall not however venture on describing it on the ground that he may possibly have incorrectly observed the palpi he described. It bears some resemblance to but is quite distinct from *Natalis, Leai*, Blackb.

O. incertus, Macl. Not known to me. Probably a true *Opilo*.

O. Pascoei, Gorh. A true *Opilo*. I have it from Victoria.

O. sexnotatus, Westw. Not a true *Opilo* as it has finely granulated eyes. I give it a new generic name (*vide infra*).

O. variipes, Chevr. A true *Opilo*, apparently very close to *O. congruus*, Newm.

O. Whitei, Gorh. (*apicalis*, White). Unknown to me. I doubt its being a true *Opilo*.

Thus it appears that there are five known Australian species confidently referable to *Opilo* and two doubtfully attributable to it.

NATALIS.

N. debilis, sp. nov. Mas.? Elongata; angusta; sat parallela; subtus sat sparsim pubescens; supra pilis erectis elongatis sparsis vestita; nigra, pedibus antennis et corpore subtus picescentibus; antennis sat elongatis sat gracilibus; oculis minus prominulis; capite confertim subtilius subaspere punctulato, puncturis paullo majoribus sparsim intermixtis; prothorace quam latiori ut 7 ad $5\frac{1}{3}$ longiori, ut caput punctulato et ad latera nonnihil (fere ut *N. porcatæ*, Fab.) ruguloso, sulco longitudinali mediano lineari sat elongato impresso, pone medium utrinque fortiter dilatato-rotundato; scutello confertim subtiliter punctulato; elytris ad apicem inermibus, seriatim punctulatis, puncturis quadratis (antice profundis sat magnis, postice gradatim minoribus minus profunde impressis); interstitiis alternis leviter costiformibus; tibiis anterioribus 4 arcuatis; abdomine sparsim subtiliter punctulato, segmentis postice late membranaceo-marginatis; pedibus sat gracilibus, femoribus posticis perlongis; tarsis sat elongatis sat gracilibus. Long., $6\frac{1}{2}$ l.; lat., $1\frac{3}{5}$ l. (vix).

At once distinguishable from all the previously described *Natales* except *porcata*, Fab., by the close even puncturation of the entire disc of its pronotum and the feebleness of the lateral rugulosity of that segment. From *porcata* it differs *inter alia* by its black colour, by its distinctly less convex eyes, by its very much more elongate prothorax, by the very evidently closer and

finer puncturation of its pronotum, and by the very wide membranous hindmargin of each ventral segment,—which is certainly not due to the abdomen of the specimen before me being distorted or unduly dilated. I have little doubt of the specimen described being a male, in which case the species is distinguished from many of its congeners (but not from *porcata*, Fab.) by the absence of patches of close sexual puncturation on the ventral segments. In my tabulation of *Natalis* (Tr. R.S., S.A., 1899, pp. 29-30) the inclusion of this species would cause the substitution for the last line of the following:—

AA. Disc of prothorax closely and evenly punctulate.
B. Prothorax much longer than wide ... ... *debilis*, Blackb.
BB. Prothorax very little longer than wide .. ... *porcata*, Fab.

S.A. (basin of Lake Eyre); taken by Herr Koch near Farina.

THANASIMUS.

There seems to be reason for regarding all the Australian insects that have been referred to this genus as incorrectly placed there. *T. accinctus*, Newm., has already been made the typical species of a new genus (*Metabasis*, Gorh.), and Mr. Gorham has already referred (correctly, I have no doubt) *T. sculptus*, Macl., and his own *T. rufimanus* to the genus *Aulicus*. *Necrobia eximia*, White (which has been attributed to *Thanasimus* by some authors,—*e.g.*, Gorham) is certainly not a *Thanasimus* in my opinion,—but here I am writing from memory (having examined a specimen not at this moment available) and so will not at present discuss its position more particularly. I know of only three other Australian species that have been placed in *Thanasimus* (viz., *acerbus*, Newm., *confusus*, Newm., and *cursorius*, Westw.), and they undoubtedly belong to the genus *Stigmatium*. They are all described insufficiently for confident identification among congeners so numerous and superficially so closely resembling each other as are the species of *Stigmatium*, but it seems to me probable that *acerbus* and *cursorius* are founded on the same insect and that it is also the same which M. Kuwert has since described as *S. dispar*. I think I know *S. confusus*, Newm., as a species that I have met with in Victoria (Newman's locality) not rarely, and it is probably identical with one or more of the species that have since been described as *Stigmatia* by other authors, but without examination of types it is difficult to arrive at a confident opinion.

CLERUS.

I regard it as extremely doubtful whether any true *Clerus* occurs in Australia. Eight Australian species are ascribed to the genus in Masters' Catalogue, one of which (*crassus*, Newm.) disappears in Lohde's Cat., having been reported (Tr. R. Soc., S.A.,

1891, p. 303) as a *Zenithicola*. Of the remainder *C. apicalis*, Macl., *Mastersi*, Macl., and *delicatulus*, Bohem., are *Aulici* (as noted below); *C. cruciatus*, Macl., is probably a *Lemidia*,—certainly not a *Clerus*; *ventralis*, Westw., is evidently an *Olesterus*; *C. guttulus*, White, has been stated by Gorham to be congeneric with *Tillus bipartitus* and therefore mentioned by me (*loc. cit.*, p. 304) as probably a *Thanasimomorpha* (but I have since identified it, and now place it,—as noted below,—in my new genus *Tarsostenodes*). *C. sepulcralis*, Westw., remains; I have not to my knowledge seen it, nor do I find anything in its description on which I can form a decided opinion as to its generic position. I note however that in a recent memoir Herr Schenkling mentions it as "*Clerus*" *sepulcralis* from which it seems probable that it is at any rate near *Clerus*. Perhaps it is an *Orthrius* (an Australian ally of *Clerus* named by Mr. Gorham and distinguished *inter alia* by its scarcely emarginate eyes).

CLEROMORPHA.

In his diagnosis of this genus (Cist. Ent., II., p. 83) Mr. Gorham indicates the number of tarsal joints visible on their upper surface as doubtful,—owing I presume to the type having lost its tarsi. His conjecture that the number is four is correct.

AULICUS.

Under this name Spinola (its author) included species from America and Australia. Later, Gorham expressed the opinion that the species of the two continents ought to be separated, but says that not having examined any of the American species he "has not ventured on the alteration," and at the same time proposes the name *Phlogistus* for the Australian species, though admitting it doubtful whether Spinola did not consider an Australian species the typical one. This is decidedly puzzling, and does not seem to me to furnish sufficient reason for rejecting Spinola's name in respect of the Australian species, although I observe that in his recent "Cleridarum Catalogus," Herr Lohde has done so but (as was of course to be expected in a mere Catalogue) without assigning a reason. It is quite possible that the need of the change of name may eventually be demonstrated, but in the absence of a diagnosis of *Phlogistus*,—which has not been provided by any author,—I retain the name *Aulicus* for the present.

The Australian species of this genus are in great confusion, not a few of them having been attributed by their authors to the old genera *Thanasimus* and *Clerus* and still standing there even in Herr Lohde's recent Catalogue. Having recently had occasion to examine a considerable number of specimens of *Aulicus* I have

taken the opportunity to study the widely scattered literature of the subject and offer the following notes as an attempt at a systematic treatment of the Australian species. Under the generic name *Aulicus* 21 specific names have been proposed for them, and two species described as *Thanasimi* and one described as *Clerus* have been shown to be in reality *Aulici*,—viz., *T. rufimanus*, Gohr., and *sculptus*, Macl., and *C. instabilis*, Newm. I now draw attention to the fact that the following also appear to be decidedly members of the same genus,—viz., *Clerus Mastersi*, Macl., *apicalis*, Macl., and *delicatulus*, Bohem. Beside the above *Xylotretus scrobilata*, Spin., is stated by Gorham to be "probably an *Aulicus*,"—a reference that is followed (but with a ?) by Herr Lohde. In this I cannot concur. Spinola describes the insect as having "5 or 6" rows of large deep foveæ on the elytra. But in all the large number of *Aulici* I have examined I have never seen one in which there is any doubt at all about the number of rows on each elytron being *ten*,—so emphatically is this the case that I am quite satisfied of the presence of that number of rows of quadrate foveolæ being a reliable generic character (as far as Australian species are concerned). Moreover Spinola describes *X. scrobilatus* as having a "transverse fold" on the non-foveolate apical portion of the elytra,—a character to which there is no approximation whatever in any *Aulicus* (or indeed in any Australian *Clerid*) known to me. I incline to the opinion that *X. scrobilatus* is erroneously attributed to Australia. If not, it probably represents a genus as yet uncharacterised. But if the "transverse fold" can be disregarded as (say) a deformity of the individual specimen, it is possible that the insect in question is a *Zenithicola*, as in species of that genus (*e.g.*, *australis*, Boisd.) the foveolæ of the lateral are so much smaller than those of the discal series that it would be correct to say there are "about 5 or 6 rows of *large deep* foveæ," though even in that case one would wonder that the describer had not added that there are also other rows of much smaller foveæ. The generic identification of *X. scrobilatus* is impossible without an inspection of the type, but whatever it may be it is not an *Aulicus* unless the description is outrageously incorrect. Unfortunately Spinola gives a wrong reference to his figure, which imparts a further difficulty into the matter (as Gorham points out, Cist. Ent., II., 88), but the figure that is probably intended for *X. scrobilatus* looks as if it might represent a *Zenithicola*.

Altogether, then, there are 27 names that must be regarded as having been given to Australian species of *Aulicus*, but a considerable number of these are synonyms, some of which have already been shown to be so. It will be convenient, however, to recapitulate them all now. The following, however, I believe to be founded on error, or mere conjecture :—

A. episcopalis, Spin., wrongly regarded by Spinola as a synonym of *instabilis*, Newn. (discussed below).

A. corallipes, Chevr., quoted by Herr Lohde as a synonym of *foveicollis*, Macl. This seems to me highly improbable. No reason is given for the reference. *A. foveicollis* is practically undescribed. It is a Queensland species, and the type is at Sydney.

A. corallipes is a familiar Tasmanian species.

A. castanipes, Westw., and *A. tibialis*, Westw. (described by White, *Clerid*, IV. 60) placed in all catalogues known to me as synonyms of *A. instabilis*, Newm. I consider this almost certainly wrong. It is possible the names were given to varieties of *A. episcopalis*, Spin., but the matter could not be cleared up without examination of the types (which are no doubt in the Br. Museum).

The following synonymy seems to be correct :—

A. affinis, Gorh.=*A. samaragdinus*, Gorh. Its author says of *affinis* "possibly only a var."

A. varicolor, Chevr.=*A. multicolor*, Chevr. Its author says of *varicolor* "probably only a var."

A. albofasciatus, Gorh.=*A. ochrurus*, Chevr. Mr. Gorham has already noted this synonymy. Both descriptions were published in 1876, and it seems doubtful which has the priority.

A. (*Thanasmus*) *rufimanus*, Gorh.=*A. chrysurus*, Chevr. Already noted by Mr. Gorham.

A. splendidus, Chevr.=*A. sculptus*, Macl. Already noted by Mr. Gorham.

The following synonymy has not been noted previously :—

A. ochrurus, Chevr. (=*albofasciatus*, Gorh.)=*A.* (*Clerus*) *apicalis*, Macl. (Macleay's name has priority).

A. viridissimus, Pasc. is (as more fully indicated below) probably a synonym for *A.* (*Clerus*) *delicatulus*, Bohem.

It should be added that in Herr Lohde's Catalogue the name "auratus, Gory., i.l." occurs as a synonym of *A. instabilis*, Newm. I do not know this insect, and have not seen the description of it, so can express no opinion about it.

Assuming the correctness of the above synonymic notes, 9 of the 27 names referred to above must be regarded as mere synonyms.

Of the 18 names remaining I have been able to identify 14 with insects on which they appear to have been founded. The four that I have not been able to identify are :—

A. foveicollis, Macl. Practically undescribed.

A. imperialis, Gorh. Seems to be differently colored from any *Aulicus* known to me. The structural characters mentioned would fit many *Aulici*.

A. lemoides, Pasc. I have not seen any *Aulicus* that will fit the description. The few structural characters mentioned are founded on a comparison with "*A. instabilis*, Newm.," but it is impossible to ascertain (without reference to his collection) to what *Aulicus* Pasc. attributed that name. I should conjecture *A. lemoides* to be possibly a var. of *A. rufipes*, Macl.

A. mellinipes, Chevr. I am convinced that I have not seen this species. If the statement that its prothorax is longer than wide is strictly accurate (by measurement) I am doubly sure that I have not seen it.

In the following pages I describe nine new species of *Aulicus* and furnish notes on several of the previously described species. I also furnish a tabulation of all the species except the four remarked on above. In this tabulation I have found it necessary in several instances to rely upon colour distinctions, because in the case of species that I have identified only by means of the descriptions it might be misleading to characterise them by characters not actually mentioned in the descriptions, as there is of course a possibility of some of the identifications being wrong, —but, as it is, the tabulation is right according to the authors' descriptions even if my identifications are wrong,—except in the case of *instabilis*, Newm., *episcopalis*, Spin., *delicatulus*, Bohem, and *corallipes*, Chevr., of which I have not seen authentic specimens, but have assumed the correctness of my identification. I may say, however, that I have not the slightest doubt about all the species included in the tabulation being perfectly valid ones. The genus has been in so complete a state of confusion that it seems worth while to treat it as a whole (which has not been done before) in respect of its Australian members, even if my treatment of it should prove eventually to require a few corrections.

Tabulation of species of the genus *Aulicus*:—

A. Elytra variegated with different colouring or pubescence in transverse zones.
  B. At least one of the zones testaceous.
    C. The apex and a median (or submedian) zone testaceous .. .. *apicalis*, Macl.
    CC. Elytra having only a median testaceous zone *crœsus*, Blackb.
    CCC. Elytra having the base and a median zone testaceous.
      D. Prevailing colour of elytra bronzy-red,—no black ... ... *Mastersi*, Macl.
      DD. Prevailing colour of elytra black ... *dives*, Blackb.
  BB. No testaceous colouring on the elytra.
    C. Apical part of elytra not aureo-villose.
      D. Club of antennæ black ... . *multicolor*, Chevr.
      DD. Club of antennæ testaceous ... ... *sculptus*, Macl.
    CC. Apical part of elytra aureo-villose .. *chrysurus*, Chevr.
AA. Elytra not variegated with different colouring or pubescence in transverse zones.
  B. Antennæ black ... . *lætus*, Chevr.

BB. Antennæ not black.
C. Antennæ reaching back to the base of the prothorax ... ... *instabilis*, Newm.
CC. Antennæ shorter.
D. Ninth and tenth elytral series quite distinct from each other and separated by a well-defined interstice to beyond middle of elytra ... ... *episcopalis*, Spin.
DD. Ninth and tenth elytral series not as in *A. episcopalis*.
E. External face of tibiæ traversed by a well-defined entire longitudinal carina.
F. Under surface of head and prothorax of dark colour.
G. Seriate sculpture of elytra continuing (gradually enfeebled) to apex *nigrohirtus*, Blackb.
GG. Seriate sculpture of elytra ceases suddenly considerably before apex.
H. No longitudinal sulcus on pronotum behind the front transverse sulcus ... ... *smaragdinus*, Gorh.
HH. A well-defined longitudinal sulcus on pronotum behind the front transverse sulcus... *robustus*, Blackb.
FF. Under surface of head and prothorax pale yellow ... ... *rufipes*, Macl.
EE. External face of tibiæ not having a continuous longitudinal carina.
F. The transverse sulci of the pronotum connected by a strong longitudinal sulcus.
G. Transverse interstices of elytral foveolæ strongly cariniform and crossing several series ... ... *Plutus*, Chevr.
GG. Transverse interstices of elytral foveolæ fine, scarcely raised, and short ... ... *delicatulus*, Bohem.
FF. Transverse sulci of pronotum not connected by a strong longitudinal sulcus.
G. Front of clypeus not both notably narrower than interval between eyes and also much emarginate.
H. Sculpture of elytra quasi-uniform from base to apex, only becoming gradually finer and closer (but not less rugulose) in approaching the apex ... ... *eremita*, Blackb.
HH. Sculpture of elytra much enfeebled at base, gradually becoming towards apex more or less finer, but still continuing rugulose.
I. Prothorax notably wider across apex than across base. (Legs entirely dark) ... ... *amabilis*, Blackb.
II. Prothorax scarcely wider across apex than across base.

J. Pronotum closely evenly and somewhat strongly punctured. (Femora red) ...	*cribratus*, Blackb.
JJ. Pronotum about middle of basal part very finely and very sparsely punctured. (Femora dark)	*modestus*, Blackb.
HHH. Sculpture of elytra much enfeebled at base, and behind suddenly changing to fine non-rugulose (or scarcely rugulose) puncturation considerably before the apex.	
I. Femora entirely dark... ...	*mundus*, Blackb.
II. Femora testaceous or red ...	*corallipes*, Chevr.
GG. Front of clypeus considerably narrower than interval between eyes and also much emarginate	*parvulus*, Blackb.

A. Cræsus, sp. nov. Supra cupeo-purpureus, elytris mox ante medium fascia testacea (hac nec suturam nec marginem lateralem plane attingenti) ornatis, corpore subtus cœruleo, labro palpis antennisque testaceis, pedibus obscuris (tibiis anticis subtus et tarsis anticis dilutis; pilis albidis elongatis sat sparsim vestitus; capite crebre fortiter subrugulose punctulato; antennis prothoracem medium vix attingentibus, articulo ultimo ad apicem emarginato; prothorace manifeste transverso, fere ut caput (sed antice minus crebre) punctulato, antice tubulato, ad partis tubulatæ basin transversim fortiter arcuatim sulcato, pone sulcum late concavo, in partis concavæ fundo longitudinaliter sulcato, mox ante basin transversim sulcato, lateribus inter sulcos transversos fortiter rotundatis; elytris 10-seriatim grosse foveolatis, seriebus basin versus vix minus distinctis vix elytrorum partem apicalem tertiam attingentibus, hac puncturis sat grossis confuse minus crebre impressa, seriebus 9^a 10^a que carina distincta ad elytrorum partem apicalem tertiam divisis. Long., $3\frac{3}{5}$ l.; lat., $1\frac{3}{10}$ l. (vix).

This species is readily distinguishable from all previously described Australian *Aulici* by its colour and marking. It will be convenient to compare it and others of its congeners with *A. chrysurus*, Chevr. (*Thanasimus rufimanus*, Gorh.), that being a previously described species which there can be no difficulty in identifying with certainty. Compared with it the present species *inter alia* differs as follows:—Antennæ much shorter (joints 9 and 10 much more transverse, joint 11 much more emarginate at apex), prothorax more transverse with much more strongly rounded sides, foveæ of the elytral series much larger (reaching the base and extending much further towards the apex). Its nearest ally is the species that I regard as *A. episcopalis*, Spin. (=*instabilis*,

Spin. var.) from which it differs (apart from colour and markings) chiefly by its shorter and more convex form, the larger and less crowded foveæ of its elytral series, the less abrupt cessation posteriorly of the same foveæ, and their continuity to the actual base of the elytra. The antennæ of these two species are extremely similar, also the conspicuousness of the ninth and tenth series of foveæ and their interstice to the commencement of the smooth apical part of the elytra.

S. Australia (Yorke Peninsula).

A. dives, sp. nov. Cyaneus, elytrorum parte dimidia basali testacea utrinque macula magna atro-cyanea humerali ornata (parte dimidia apicali atro-cyanea utrinque macula magna sanguinea ante-apicali notata), antennis palpis tibiis anticis tibiarum intermediarum apice et tarsis anticis intermediisque testaceis; pilis albidis elongatis sparsim vestitus; capite fortiter minus crebre punctulato; antennis prothoracem medium haud attingentibus, articulis 9°—11° transversis, 11° ad apicem leviter emarginato; prothorace sat fortiter transverso, fere ut caput (sed nonnihil magis grosse) punctulato, antice breviter tubulato, ad partis tubulatæ basin transversim fortiter arcuatim sulcato, pone sulcum late concavo, in partis concavæ fundo longitudinaliter sulcato, mox ante basin transversim sulcato, lateribus inter sulcos transversos sat fortiter rotundatis; elytris 10-seriatim grosse foveolatis interstitiis minus angustis, seriebus basin versus obsoletis nec elytrorum partem apicalem tertiam attingentibus, hac sparsim sat subtiliter punctulata, seriebus 9ª 10ª que vix ultra elytra media attingentibus. Long., 3 l.; lat., $1\frac{1}{5}$ l. (vix).

In this species the apical joint of the maxillary palpi is more strongly securiform than in most of its congeners. Lacordaire tabulates *Aulicus* as having that joint securiform, but in diagnosing the genus says that it is of the form of an elongate triangle, which is quite correct as regards most of the species,—but in this one the triangle is scarcely elongate. It may be noted, too, that Lacordaire calls the claws of *Aulicus* "simple," but I find them to have a very small and feeble sub-basal tooth which in the present species is scarcely traceable. This species is remarkable for its short antennæ, having their apical joint distinctly transverse. The seriate punctures of the elytra are scarcely smaller than in *A. crœsus* but they are less sharply defined, their interstices being less narrow and carina-like than in most *Aulici*. Apart from coloring and pattern the present species differs from *A. chrysurus, inter alia* by the very much coarser seriate punctures of its elytra, from *A. crœsus* by the seriate puctures of the elytra not nearly reaching the base, from *A. episcopalis* by the

9th and 10th series scarcely passing the middle of the length of the elytra, and from *A. apicalis*, Macl., by the apical part of its elytra nearly black. It is perhaps nearest to *A.* (*Clerus*) *Mastersi*, Macl. The characters attributed to that species (apart from those relating to colour) are valueless for identification, being common to almost all *Aulici*. The pattern of *A. Mastersi* seems to bear a general resemblance to that of the present insect, but the general colour of the elytra is said to be "bronzy red" which is certainly not the general colour in *A. dives*, and the very great distance apart of the localities in which the two insects were taken renders it unlikely that they are varieties of one species.

S. Australia (Mt. Lofty Range).

A. nigro-hirtus, sp. nov. Supra cœruleus purpureo-micans, subtus cyaneus, antennis (clava nonnihil infuscata excepta) palpis et tarsis anticis testaceis, tibiis anticis subtus ferrugineis, pedibus alibi purpureis; pilis sat elongatis (his in corpore supra obscuris, subtus albidis) vestitus; capite crebre fortius nec rugulose punctulato; antennis prothoracem medium vix superantibus, articulo ultimo fere ut generis *Eleale* appendiculato; prothorace vix transverso, fere ut caput punctulato sed puncturis rugis transversis intermixtis, postice breviter (sed antice nullo modo) tubulato, antice transversim arcuatim (postice recte) sulcato, inter sulcos æqualiter convexo, lateribus ab angulis anticis fere ad basin æqualiter arcuatis; elytris 10-seriatim foveolatis, seriebus 9ª 10ª que ultra medium vix distinctis ceteris in elytrorum partem quartam apicalem continuis, foveolis quam *A. chrysuri*, Chevr., parum magis grossis, parte apicali confuse nec crebre punctulata; tibiis extus carinatis. Long., 4 l. (vix); lat., $1\frac{2}{3}$ l.

The notable characters of this species are the strongly appendiculate apical joint of its antennæ which is scooped out on its wide compressed face in such fashion as to make it from a certain point of view look like two joints, the pronotum without concavity or longitudinal sulcus behind the anterior transverse sulcus, and the tibiæ with a conspicuous longitudinal carina on their external face. The foveæ of the elytral series are notably less coarse and more closely placed than in the species I call *episcopalis*, Spinola; the series (as such) are exceptionally conspicuous owing to the longitudinal interstices being distinctly more elevated than the interstices separating fovea from fovea in the series. Perhaps nearest to *A. imperialis*, Gorh., but evidently very distinct from it as that species is described as having its pronotum abruptly narrowed in front and much depressed dorsally.

N. Queensland.

A. instabilis, Newm. There seems to be much confusion about

this species. It is quite clear to me that Spinola did not identify it correctly, and I should say that in all probability Newman himself mixed two species under the name. Newman's very brief description mentions only one character that is of real value in determining what insect he had before him, viz., "protibiæ subtus testaceæ." Trivial as this character might seem I have examined sufficiently long series of several *Aulici* to enable me to say that it is of great value. To this clue may be added another in the fact that almost all the *Cleridæ* described by Newman are Victorian species, and still another in the *size* (long., $\frac{4}{10}$ of an inch) being stated. Now I have taken somewhat plentifully in Victoria two species of *Aulicus* whose front tibiæ are invariably black (or dark piceous) on their upper surface and testaceous beneath, the two colours being in quite abrupt and conspicuous contrast. My opinion is that Newman had both these insects before him and did not observe their specific difference. One of them is about of the size Newman quotes, and of deep violet blue colour with elongate antennæ,—the other is decidedly smaller and of a bright green colour with shorter antennæ. Newman says "Colore instabilis, nunc viridis, nunc violaceus" and mentions no other character that is not generic except the peculiar colouring of the front legs. As the size given is that of the larger insect just referred to I feel little doubt of its having been that on which the species *instabilis* was founded and conjecture that either Newman had before him also a green variety (unknown to me) of it, or that he had before him the smaller species referred to above and overlooked its specific difference from the specimen on which he founded his description (or at all events his measurement).

I feel very little doubt that *A. instabilis*, Spinola, is a species that occurs in many parts of S. Australia and even extends into the S.-Eastern part of Western Australia, and is much more variable in colouring than I have found the species to be which I regard as *instabilis*, Newm. Its front tibia are not of two colours divided longitudinally, but are (as Spinola describes them) wholly dark except near the apex where they have a tendency to become testaceous. The species differs from that mentioned above as *instabilis*, Newm., *inter alia* by its shorter antennæ, and the considerably larger seriate punctures of its elytra which moreover are well defined on a larger area of the elytra (becoming obsolete only close to the base and in the apical one-fourth), the ninth and tenth rows being separated by a continuous distinct carina quite into the apical one-fourth of the elytra. As Spinola described a colour-var. of this insect under the name *episcopalis*, this latter may now stand as the name of the species.

A. robustus, sp. nov. Sat elongatus, sat convexus; supra ignæo cupreus, capite pronotoque paullo obscurioribus, antennis palpisque testaceis (illarum clava et palporum labialium articulo apicali obscuris); subtus obscurus vel atro-cyaneus, pedibus læte cyaneis, tarsis anticis ferrugineis ceteris picescentibus; pilis pallidis elongatis vestitus; capite fortius sat crebre punctulato, inter oculos late leviter impresso; antennis prothoracem medium paullo superantibus, articulis 9° 10° que sat transversis 11° obovato ad apicem acuto extus leviter excavato; prothorace vix transverso, supra sparsim fortius inæqualiter nec rugulose punctulato, sat longe pone apicem arcuatim (et mox ante basin recte) sulcato, pone sulcum anticum longitudinaliter profunde breviter canaliculato, lateribus ante sulcum anticum et inter sulcos separatim rotundatis; elytris 10-seriatim foveolatis (seriebus 9ª et 10ª haud carina acuta divisis), foveolis fere a basi ad partem posticam tertiam continuis (hic subito desinentibus), parte apicali subtiliter vix seriatim punctulata, serierum interstitiis a foveolarum interstitiis transversis tubatis; tibiis extus longitudinaliter carinatis. Long., 4—4½ l.; lat., 1⅕—1⅗ l.

This species bears much general resemblance to that which I take to be *A. Plutus*, Chevr., but differs from it *inter alia* by the much shorter longitudinal channel of its pronotum, by the much less coarse sculpture of its elytra, and by the well-marked longitudinal carina that traverses the whole length of the external face of its tibiæ.

N.S. Wales (Inverell; given to me by the late Mr. Olliff).

A. mundus, sp. nov. Minus elongatus, minus convexus; læte cyaneus, antennis palpis et tibiis tarsisque anticis testaceis, tibiis tarsisque posterioribus 4 picescentibus; pilis sat elongatis fulvis vestitus; capite crebre ruguloso, inter oculos fovea profunda impresso, antennis prothoracem medium paullo superantibus, articulis 9° 10° que sat fortiter transversis 11° obovato; prothorace vix transverso, supra crebre rugulose punctulato, pone apicem arcuatim (et ante basin recte) sulcato, pone sulcum anticum longitudinaliter brevissime canaliculato, lateribus ante sulcum anticum et inter sulcos separatim rotundatis; elytris 10-seriatim foveolatis (interstitio inter series 9ªm et 10ªm ultra elytra media haud cariniformi), foveolis in parte basali obsoletis et subito ad partem apicalem tertiam desinentibus, parte apicali subtiliter vix seriatim punctulata, serierum interstitiis a foveolarum interstitiis transversis turbatis. Long., 3 l.; lat., 1 l.

Very closely allied to *A. amabilis*, Blackb., but satisfactorily distinguishable by the absence of the subscutellar gibbosity on

the elytra and the *sudden* ending of the seriate foveolæ of the elytra at the beginning of the apical one-third part of the elytra. There is also a difference in the apical joint of the antennæ on which in *A. amabilis* there is a distinct external excavation (but not in the present species). The seriate foveolæ of the elytra are in both very similar to those of *A. chrysurus*, Chevr. Also (disregarding colour) near to *A. corallipes*, Chevr., but differing from it *inter alia* by the seriate sculpture extending scarcely into the apical one-third of the elytra, while in *corallipes* it reaches nearly into the apical one-fourth.

S. Australia (Mount Lofty Range).

A. (*Clerus*) *delicatulus*, Bohem. I have taken an *Aulicus* in the Sydney neighbourhood which I have no doubt is Bohemann's species. It does not seem to present very strong characters, its most striking feature being I think the comparatively feeble sculpture of its elytra, which consists of rows of transversely quadrate impressions separated by continuous longitudinal interstices which are (not, as they are in *A. chrysurus*, Chevr., thrown out of shape or zigzagged by still stronger transverse interstices running continuously across several of the rows but) straight. In respect of that sculpture it resembles *A. nigrohirtus*, but in that species the foveæ are considerably larger and deeper, and the interstices (both longitudinal and transverse) are considerably stronger and more cariniform; in *delicatulus* the longitudinal interstices are almost flat, and carry a straight row of fine and not very closely placed punctures. The sculpture of the median part of the elytra does not in *A. delicatulus* abruptly cease or change its character at a more or less considerable distance from the apex (as it does in many species of *Aulicus*) but merely becomes near the apex a little feebler and less seriate. The hind tibiæ and tarsi are unusually slender, which suggests the idea that *A. viridissimus*, Pasc. (also from Sydney) may be a later name for the same insect. Pascoe's statement that in *A. viridissimus* the elytra are "coarsely" punctured in rows seems perhaps inconsistent with such identity, but the expression is not altogether inapplicable to the elytra of the insect before me *absolutely*, although *comparatively* (*i.e.*, compared with most other *Aulici*) the sculpture is not coarse. Some remarks seems to be called for on my having placed *delicatulus* in my tabulation (above) with *A. Plutus*, Chevr., as having the longitudinal channel of the pronotum exceptionally long, whereas Bohemann says of its pronotum "*breviter canaliculato.*" Bohemann calls it by the name "*Clerus*," however, and it is in comparison with that of other *Aulici* that I call the longitudinal channel of its pronotum elongate. Absolutely, the channel may be called "short" as it does not reach the base, and does not nearly reach the front margin, of the pronotum.

A. eremita, sp. nov. Elongatus, sat angustus, sat convexus; colore instabilis; antennis palpisque testaceis, pedibus obscuris, tarsis anticis plus minusve ferrugineis; pilis elongatis vestitus (his in capite pronoto elytrisque fulvis, alibi dilutioribus); capite inæquali, inæqualiter punctulato, longitudinaliter sat manifeste rugato, clypeo antice subtruncato quam inter oculos caput haud angustiori; antennis prothoracem medium manifeste superantibus, articulis 9° 10° que transversis 11° ovato ad apicem acuto; prothorace quam longiori vix latiori, supra inæqualiter subtilius punctulato et transversim subtiliter rugato, sat longe pone apicem arcuatim (et mox ante basin recte) sulcato, pone sulcum anticum longitudinaliter breviter vix perspicue canaliculato, lateribus ante sulcum anticum et inter sulcos separatim rotundatis; elytris 10-seriatim foveolatis (seriebus 9ª 10ª que ultra medium vix distinctis), foveolis a basi fere ad apicem continuis sed in parte quarta postica gradatim minus seriatis minus quadratis, serierum interstitiis a foveolarum interstitiis transversis multo turbatis. Long., 2⅘ l.; lat., 1 l. (vix).

I found a batch of specimens of this insect on flowers on the Dividing Range in Victoria, which vary extremely in coloring, containing green, blue, coppery, and golden individuals. The legs are usually of the general colour,—but always dark, except the front tarsi which are more or less red. The antennæ palpi and pilosity do not vary in colour. Usually the whole surface is unicolorous, but in some examples the pronotum differs in colour from the elytra and the under surface from the upper. Among the species not having a variegated pattern on the elytra, having dark legs and testaceous antennæ, the ninth and tenth rows of elytral foveolæ confused behind the middle, the elytral sculpture not abruptly ceasing (or nearly so) considerably before the apex, the antennæ not reaching back to the base of the prothorax, and having the symmetry of the longitudinal interstices of the elytra much disturbed by transverse interstices continuous across several of the longitudinal interstices, this insect is distinguished by its clypeus being in front as wide as the interval between the eyes and its elytral sculpture being continuous quite to the base o the elytra. It is also notable by the unevenness of the surface of its head, and by its elongate somewhat cylindric form.

Victoria (Dividing Range).

A. amabilis, sp. nov. Minus elongatus, minus convexus; læte viridis, antennis palpis, tibiis anticis subtus et tarsis anticis testaceis; supra pilis elongatis obscuris et brevibus testaceis (alibi pilis elongatis pallidis) vestitus; capite sat plano, inter oculos foveato, æqualiter crebre ruguloso, clypeo antice fere

truncato quam interoculos caput haud angustiori ; antennis prothoracem medium paullo superantibus, articulis 9° 10° que transversis 11° ovato ad apicem acuto extus leviter excavato; prothorace leviter transverso, sat æqualiter fere ut caput ruguloso, sat longe pone apicem arcuatim (et mox ante basin recte) sulcato, pone sulcum anticum late impresso (parte impressa in fundo longitudinaliter canaliculata), lateribus ante sulcum anticum et inter sulcos separatim fortiter rotundatis ; elytris 10-seriatim foveolatis (interstitio inter series 9am 10am que parum ultra medium distincto), prope scutellum utrinque et ad humeros manifeste tumidis, foveolis (serie subsuturali excepta) in parte basali obsoletis et in parte apicali tertia confusis et minus distinctis nec manifeste quadratis, serierum interstitiis a foveolarum interstitiis transversis multo turbatis. Long., $2\frac{3}{5}$ l.; lat., 1 l.

In this species the discal sculpture of the elytra becomes confused and feeble towards the apex more rapidly than in the other species of the aggregate which I have tabulated as having this sculpture only *gradually* enfeebled,—so that it is somewhat intermediate between that aggregate and the next. Its general characters associate it with *A. eremita* from which it differs in many points (cited in the description), the most definite being perhaps that mentioned in the tabulation,—the seriate foveæ of the elytra commencing considerably behind the base of the elytra. It is a shorter and more depressed species than *A. eremita* and does not seem to vary in colour (I have half a dozen specimens taken in company). The part of the prothorax in front of the anterior transverse sulcus is so strongly rounded separately at its sides that the lateral outline of the prothorax (viewed from above) seems to have a deep emargination a little behind its front extremity. *A. parvulus*, Blackb., is somewhat closely allied to this and the preceding species (*A. eremita*), but is easily distinguished from them by *inter alia* its clypeus considerably narrower in front and strongly emarginate, and by the transverse interstices of its elytral foveæ being so strong and continuous as almost to conceal the existence of the longitudinal interstices.

Victorian Alps.

A. cribratus, sp. nov. Modice elongatus, minus convexus ; supra cyaneus, antennis palpis et (tibiis tarsisque posterioribus nigris exceptis) pedibus testaceis; subtus cyaneus vel viridescens ; pilis elongatis (his in corpore supra obscuris, in corpore subtus albidis) vestitus ; capite confertim æqualiter ruguloso, inter oculos fovea impresso ; antennis prothoracem medium parum superantibus, articulis 9° 10° que transversis 11° obovato ad apicem acuto ; prothorace quam latiori sublongiori, ut caput punctulato, sat longe pone apicem

arcuatim (et mox ante basin recte) sulcato, pone sulcum anticum longitudinaliter brevissime canaliculato, lateribus ante sulcum anticum et inter sulcos separatim rotundatis; elytris 10-seriatim foveolatis (interstitio inter series 9^{am} et 10^{am} ultra elytra media haud cariniformi), foveolis per elytra tota fere continuis sed apicem versus haud quadratis minus crassis, serierum interstitiis a foveolarum interstitiis transversis turbatis. Long., $3\frac{1}{2}$ l., lat., $1\frac{1}{5}$ l.

This species is closely allied to *A. corallipes*, Chevr., but is certainly a distinct species. In a considerable number of specimens before me the hind tibiæ and tarsi are invariably black, the intermediate tarsi invariably black, and the intermediate tibiæ invariably more or less black. The few specimens I have seen of *corallipes* (from Tasmania) all have entirely red legs. There is also considerable and constant difference in the sculpture of the elytra which in *cribratus* begins close to the base and attains the apex, only becoming finer and less regular near the apex (so that this species has about the strongest apical puncturation of any in the genus); while in *corallipes* the sculpture begins considerably behind the base and changes suddenly at the commencement of the apical third of the elytra into a feeble non-rugulose puncturation.

S. Australia and N.S. Wales.

A. modestus, sp. nov. Angustus, elongatus, modice convexus; supra obscure æneus, antennis palpisque testaceis, subtus obscure cyaneus; pilis elongatis (his in corpore supra obscuris, in corpore subtus albidis) vestitus; capite antice crebre ruguloso, postice minus crebre punctulato, inter oculos fovea impresso; antennis prothoracem medium vix attingentibus, articulis 9° 10° que transversis 11° obovato ad apicem acuto; prothorace vix transverso, inæqualiter (in medio fortius sat crebre, apicem basinque versus subtilius sparsius) punctulato, in medio transversim rugato, sat longe pone apicem arcuatim (et mox ante basin recte) sulcato, pone sulcum anticum longitudinaliter minus breviter canaliculato, lateribus ante sulcum anticum et inter sulcos separatim rotundatis; elytris 10-seriatim foveolatis (interstitio inter series 9^{am} 10^{am} que haud cariniformi), foveolis basin versus obsoletis apicem versus gradatim minus quadratis minus seriatis magis confertis, serierum interstitiis a foveolarum interstitiis transversis turbatis. Long., $3\frac{1}{5}$ l.; lat., 1 l.

Var. (?immat.) pedibus sordide testaceis.

This species is closely allied to *A. eremita*, Blackb. It differs from that insect in colour which is (invariably in all the examples I have seen) dull bronzy above and blackish (tending to cyaneous) beneath, the antennæ and palpi testaceous, the front

tarsi somewhat ferruginous,—*eremita* being a brilliantly coloured and much more nitid insect. In *eremita* the seriate sculpture of the elytra reaches the actual base without any enfeeblement whatever so that there is no indication of the base of the elytra being more nitid than the rest of the surface, while in *modestus* on the basal portion of the elytra the seriate sculpture becomes very faint and sparse, so that that region is conspicuously more nitid than the general surface. In *eremita* the transverse carinæ separating fovea from fovea in the series are stronger than in *modestus* and more elongate (a greater number of them being continuous across several series of foveolæ), causing the elytra to appear very manifestly more coarsely rugulose; and in *eremita* the whole surface of the head is vaguely uneven, while in *modestus* the surface of the head is flat with merely a single fovea-like impression between the eyes.

S. Australia and Victoria.

SCROBIGER.

Chevrolat (Rev. et Mag. de Zool., 1874, p. 34) refers *Opilo mœrens*, Westw., to this genus. His statement does not appear to have been founded on an inspection of the type, and I believe it to be erroneous. According to the size given by its author it is a very much smaller insect than any known *Scrobiger*, and *inter alia* its pronotum is very differently sculptured from that of other species of that genus and its palpi are all subequal. I presume that Chevrolat's reason for regarding *mœrens* as a *Scrobiger* is Westwood's calling its elytra in the front part "rude punctato-striata." This phrase, however, is used by Westwood for elytra (*e.g.*, those of *Cleromorpha*) which are infinitely less coarsely sculptured than those of *Scrobiger*. Westwood's locality for *mœrens* is Adelaide, and I think I am fairly well acquainted with the *Cleridæ* of the Adelaide district. I have seen only one *Clerid* which agrees with Westwood's description, viz., the introduced *Tarsostenus univittatus*, Rossi, and that insect agrees with it very well and occurs near Adelaide. I have no doubt, therefore, that the name *Opilo mœrens* must be regarded as a synonym of *T. univittatus*.

NEOSCROBIGER (gen. nov. *Cleridarum*).

Palporum articulus apicalis securiformis; caput breve; labrum transversum antice emarginatum; antennæ modicæ (prothoracis basin vix superantes), clava sat laxe 3-articulata; oculi modici, supra inter se distantes, subtiliter granulati, transversim subreniformes; prothorax sat elongatus, postice angustum tubuliformis, supra pone apicem transversim sulcatus; elytra sat elongata, quam trans basin lata plus quam duplo longiora, æqualia, in parte apicali fere dimidia

sublævia; pedes sat elongati, femoribus posticis elytrorum apicem plane vel fere attingentibus tarsis 5-articulatis, articulo basali (tarsorum omnium) superne haud manifesto, articulo ultimo robusto præcedenti parum exserto, unguiculis parvis simplicibus divaricatis; corpus modice elongatum, capillis erectis vestitum.

Type *Opilo patricius*, Klug (*sexnotatus*, Westw.).

O. patricius, Klug, cannot be rightly placed in any hitherto characterised genus. Its finely granulated eyes separate it strongly from *Opilo;* its tarsi (all apparently four-jointed,—owing to the basal joint being concealed,—when viewed from above), the securiform apical joint of its maxillary palpi, and its pronotum transversely sulcate near the front, in combination associate it with the *Scrobiger* group of genera. Among those genera its mesosternum not vertical in front, its elytra neither fasciculate nor tuberculate and having a large apical space nitid and almost unpunctured, and its form (the elytra considerably more than twice as long as at the base wide) are sufficient to distinguish it.

Characters such as these appear to me certainly entitled to be treated as generic in the *Cleridæ*, a family in which many structural characters seem to be of less value than they are in most families, *Metabasis* and *Thanasimomorpha*, e.g. (also *Tarsostenus* and *Paratillus*) being so much like each other respectively that it seems strange to separate them widely, and yet having a totally different tarsal structure one from another. No doubt structural differences must have their full weight, and it is out of the question to associate under one generic name species having such, but much study of the Australian *Cleridæ* satisfies me that it is also out of the question to associate under one generic name (at least as far as the Australian *Cleridæ* are concerned) species differing widely in facies and sculpture because one cannot find important differences in the structure of the eyes, palpi, tarsi, &c. *Aulicus*, *Trogodendron*, *Scrobiger*, and the present genus, undoubtedly resemble each other closely in structural characters, but each has so distinctive and constant a facies and type of sculpture that it seems unreasonable to merge any two of them under one generic name. Probably when their life histories and habits are fully known it will be found that each of these genera mimics the facies of the group of insects on which it is parasitic.

N. rauciceps, sp. nov. Sat elongatus, postice sat dilatatus; sat nitidus; æneo-niger, labro antennis palpis tibiis tarsisque rufis, elytris ante medium macula discoidali et ad medium fascia sat lata albidis ornatis (parte apicali rufescenti dense albido pubescenti); capite confertim subgrosse ruguloso,

palporum maxillarium articulo ultimo leviter securiformi, antennis prothoracis basin paullo superantibus; prothorace quam latiori vix longiori, supra antice ut caput (in disco retrorsum gradatim minus crebre) ruguloso, inæquali (antice angulatim mox ante basin recte transversim sulcato, pone sulcum anticum impresso, ante basin 3-tuberculato), lateribus mediis fortiter rotundato dilatatis; elytris a basi ultra medium seriatim sat grosse foveolatis, alibi lævibus. Long., 4 l.; lat., $1\frac{1}{10}$ l.

Much resembling *N.* (*Opilo*) *sexnotatus*, Westw., but with the apical joint of the maxillary palpi so feebly securiform as to suggest generic distinction. Compared with *sexnotatus* the markings on the elytra are whitish instead of yellow, the subapical spot wanting but the whole apex faintly reddish and densely clothed with whitish pubescence; the femora entirely dark; the head and pronotum much more strongly rugulose, the surface of the latter being considerably more uneven behind; the elytra narrower at the base and consequently more dilated near the apex. I do not find any structural difference between this species and *sexnotatus* except that in the maxillary palpi and a trifle less elongation of the hind femora.

Victoria (Dividing Range).

EBURIPHORA.

This generic name must be removed from the Australian Catalogue, as its presence there rests on the authority of Klug's *Opilus patricius* having been referred to *Eburiphora*. This Tasmanian insect is clearly identical with Westwood's *O. sexnotatus* (also from Tasmania,—a species discussed above) and is certainly not an *Eburiphora* (*inter alia* it has not appendiculate claws). As Klug's is the older name the species must be known as *patricia*, Klug.

TARSOSTENUS.

I do not believe that any member of this genus is native to Australia. I have myself taken and recorded the occurrence of *T. univittatus*, Rossi, near Adelaide, but it is no doubt introduced from some other country. The following notes relate to the three really Australian species that have been attributed to the genus.

T. Mastersi, Macl. The description does not read at all like that of an insect very closely resembling *Tarsostenus*; and if Macleay's statement "eyes coarsely granulate" be correct, the word "coarsely" being used in the sense Lacordaire uses it of *Clerid* genera, the species cannot be placed even near *Tarsostenus*.

T. zonatus, Blanch. This species is certainly identical with *Paratillus* (*Clerus*) *carus*, Newm. Newman's name has priority.

T. pulcher, Macl. The description of this insect does not

suggest the idea of a *Tarsostenus;* indeed Macleay himself says that the insect has the appearance of a *Tillus.* I suspect, however, that it is congeneric with the species described below as *Tarsostenodes simulator.*

TARSOSTENODES (gen. nov. *Cleridarum).*

Palporum articulus apicalis securiformis; labrum transversum antice emarginatum; antennæ modicæ (prothoracis basin vix superantes), clava 3-articulata distincta articulis præcedentibus 4 conjunctis longitudine sat æquali; oculi modici, supra inter se sat distantes, fortiter convexi, sat subtiliter granulati, subrotundati, antice emarginati; prothorax elongatus, antice elongato-globulosus postice sub-tubuliformis (*Homæmotæ* prothoracem simulans); elytra longissima angusta apicem versus sat abrupte (nonnihil globulose) dilatata, nec tuberculata nec fasciculata, notulis eburneis, ornata; pedes sat elongati, femoribus posticis elytrorum apicem haud attingentibus, tarsis 5-articulatis, articulo basali (tarsorum omnium) superne haud manifesto; unguiculis subappendiculatis; corpus angustissimum, capillis erectis vestitum.

The insect for which I propose this name mimics in a very remarkable manner Longicorn genera such as *Homæmota* or *Zoedia*, in company with which I found it on flowers. I think it should be placed near *Tarsostenus*, from which *inter alia* the raised ivory-like markings on its elytra readily distinguish it. *Clerus guttulus*, White, is a member of this genus.

T. simulator, sp. nov. Subopacus; læte viridis, labro palpis antennis pedibus scutello et pectore rufo-testaceis, elytris (basi apiceque late viridibus exceptis) rufo-cupreis, his lineis elevatis eburneis binis obliquis ornatis (sc. linea brevi antemediana a margine externo retrorsum, et linea longiori postmediana a margine externo antrorsum, directis); capite pronotoque confertim subtilius rugulosis; elytris a basi ultra medium æqualiter vix lineatim confertim sat grosse (alibi quam pronotnm paullo magis subtiliter) rugulosis. Long., 4 l. (vix); lat., 1 l.

Very different from *T.* (*Clerus*) *guttulus*, White, in its colours and markings; also, *inter alia*, by the notably wider club of its antennæ.

Victoria (Dividing Range).

HYDNOCERA.

This generic name must drop out of the Australian Catalogue, *H. bella*, Westw., having been recently shown by Herr Schenkling (Deutsch. Ent. Zeit, 1898, p. 180) to be a *Lemidia.*

PYLUS.

P. anthicoides, Newm., has been stated by Gorham (Tr. Ent. Soc., Lond., 1878, p. 154) to be an African species,—an assertion that is accepted by Lohde in his recent Catalogue. Newman certainly implies that it is Australian. Probably he was in error as to the place of capture,—or the specimen was an accidentally imported one. I have not seen any Australian *Clerid* agreeing with Newman's description.

TENEBRIONIDÆ.

HYPOCILIBE.

H. veternosa, sp. nov. Late ovata; minus opaca; nigra, antennis apicem versus et tarsis subtus picescentibus; vix perspicue punctulato; clypeo utrinque vix perspicue impresso, antice late manifeste emarginato; prothorace quam longiori ut 16 ad 9 (postice quam antice, ut 8 ad 6) latiori, antice modice emarginato (margine antico in parte mediana late recto), fortiter (a latere viso) convexo, lateribus modice arcuatis postice sinuatis, angulis anticis minus (posticis fortiter) acutis; scutello perlato, utrinque postice late profunde impresso; elytris (a latere visis) valde convexis, leviter reticulatim strigosis, quam prothorax ut 12 ad $8\frac{1}{2}$ latioribus, lateribus rotundatis anguste reflexis, postice alte declivibus; tibiis intus haud tomentosis; coxis anterioribus 4 pubescentibus. Long., 8 l.; lat., $4\frac{1}{2}$ l.

Differs from *H. Macleayi*, Bates, by the elytra without any trace of costæ (even at the suture) and from *H. impunctata*, H. Rutenb., by the very distinct (though faintly impressed) reticulation of the elytra which is due to the presence of numerous wrinkles irregularly traversing the surface. The strongly convex form of the pronotum causing its outline (viewed from the side) to appear very strongly declivous in its hinder one-fourth, the extremely convex elytra (with their greatest height—viewed from the side—considerably behind the middle), the clypeus distinctly emarginate in front, the scutellum deeply excavated on either side in the hinder part, and the densely pubescent anterior 4 coxæ, are characters that in combination distinguish this species from all its described congeners (excluding the two already mentioned,—of which I have not seen examples). It is nearest to *H. heroina*, Blackb., which, however, is a much larger and more nitid insect, with the clypeus rounded in front, the surface of the scutellum even, the reflexed edging of the elytra notably wider, &c., &c.

S. Australia (Basin of Lake Eyre); taken by Herr Koch near Farina.

CURCULIONIDÆ.

ALCIDES.

A. terræreginæ, sp. nov. Sat parallelus; sat cylindricus; castaneus, prothorace antennis tarsis et corpore subtus obscurioribus; pronoto ad latera dense albo-squamoso; elytris maculis quinis albo-squamosis ornatis (sc. 1ª basali lineari longitudinali in interstitio 3° sita, 2ª parva in interstitio 7° hujus ad longitudinis medium sita, 3ª post-mediana in interstitio 3° sita, 4ª quam 3ª vix posteriori in interstitio 7° sita, 5ª subapicali in interstitio 4° sita), corpore subtus plus minusve dense albo-squamoso; rostro modice elongato leviter arcuato; prothorace quam in medio longiori paullo latiori, subquadrato, sat crebre ruguloso; scutello punctiformi; elytris striatis, striis grossissime nec crebre punctulatis, interstitiis sat angustis sat rugulose punctulatis; femoribus subtus dente magno serrato armatis; tibiis arcuatis; segmento ventrali 2° quam 3ᵘˢ paullo longiori. Long. (rostr. excl.) $2\frac{4}{5}$ l.; lat., 1 l.

This little species is very distinct from all its congeners of which I have been able to see the descriptions; from all its described Australian congeners it differs widely, *inter alia*, by the markings of its elytra, which consist of 5 spots on each elytron, one of them being an elongate line on the basal portion of the 3rd interstice and there being no spots on the suture or lateral margins. In shape it closely resembles *A. brevicollis*, Pasc. (as figured in Ann. Mus. Gen., 1885, T.I., fig. 7), but with the prothorax very much less transverse. In one of the examples before me there are traces of a scaly spot near the middle of the base of the pronotum.

Queensland (near Charters Towers).

ANTHRIBIDÆ.

This family is somewhat numerously represented in Australia, though but few of its genera seem to be plentiful in species and but few of its species plentiful in individuals. Its Australian genera (including the new ones I form in the following pages) having more than doubled in number since the issue of Masters' Catalogue in 1886, it seems desirable to furnish a table showing their relation *inter se*. In trying to meet this requirement I have in the main followed the lines of Lacordaire's classification, adopting his principal division based upon the position of the scrobes in which the antennæ are inserted, and also his principal division of the larger group (*Pleurocères*,—having the scrobes lateral) into two aggregates with the transverse carina of the pronotum (*a*) antebasal (*b*) basal. Lacordaire's principal character for dividing the second main group (*Anocères*) does not at present

concern us, since the second aggregate of that group has not been reported as Australian. Beyond this I have not strictly followed Lacordaire, as his principal (so far as concerns the Australian *Anthribidæ*) subdivisions of the two main aggregates of the *Pleurocères*,—based on the width of the rostrum at its base and the more or less cylindric form of the body,—seem to shade off into each other in a somewhat perplexing manner. [Lacordaire, *e.g.*, tabulates the true *Anthribides* as of oblong or oval,—contrasted with cylindric,—form, but in the detailed diagnoses of their genera calls some of them "almost cylindric," "subcylindric," and even unreservedly "cylindric."] I have adopted in the place of those characters others which Lacordaire treats as subordinate to them, founded on (*a*) the relation between the upper and lower edge of the rostral scrobe, in the one case the lower edge protruding outwards further than the upper edge or the upper edge cutting into the lateral margin of the rostrum, so that the scrobe is visible from above; in the other case the upper edge not cutting into the lateral margin of the rostrum and the lower edge not protruding outwards beyond the upper, and the scrobe consequently being entirely invisible from above (*b*) the form of the eye.

Of the *Anthribid* genera known as Australian I have been able to include in the following tabulation all except *Telala*,—which is a genus characterised by Mr. Jordan (Ent. Z. Stett, 1895, p. 143). I do not think that it is represented among the *Anthribidæ* before me, and as its author does not say whether the rostral scrobes are visible from above I cannot place it in my tabulation without seeing it. It is founded on a species of moderately large size, with spinose elytra.

Tabulation of the *Anthribid* genera known to be Australian:—

A. Antennæ inserted on the side of the rostrum.
  B. A transverse carina (independent of the base) on the pronotum.
    C. Prosternum and mesosternum elevated and contiguous ... ... Bythoprotus.
    CC. Prosternum and mesosternum not as in *Bythoprotus*.
      D. Rostral scrobes visible from above, and not basal vertical and sulciform.
        E. Eyes small and very elongate.
          F. Carina of pronotum strongly arched ... Ancylotropis.
          FF. Carina of pronotum straight ... ... Genethila.
        EE. Eyes not as in the preceding two genera.
          F. Eyes approximate on the forehead ... Litocerus.
          FF. Eyes lateral, and distant from one another.
            G. Carina of pronotum straight ... ... Ethneca.
            GG. Carina of pronotum strongly arched ... Commista.
      DD. Rostral scrobes not visible from above unless they are basal vertical and sulciform.
        E. Eyes entire or nearly so.

F. Rostral scrobes slightly visible from above, basal, vertical, and sulciform.
G. Club of antennæ 4-jointed ... ... Eucorynus.
GG. Club of antennæ 3-jointed ... .. Ecelonerus.
FF. Rostral scrobes quite invisible from above.
G. Rostral scrobes distinctly sulciform.
H. The rostrum forms a perfectly even surface with the head ... ... Entromus.
HH. The rostrum is on a different plane from the head ... ... Epargemus.
GG. Rostral scrobes foveiform.
H. Metasternum not extremely short.
I. Antennæ notably shorter than head and prothorax.
J. Joint 9 of antennæ scarcely wider than 8 ... ... Enspondus.
JJ. Joint 9 of antennæ as wide as joint 10.
K. Antennal club compact ... Tropideres.
KK. Antennal club loosely articulate ... ... Apatenia.
II. Antennæ considerably longer than head and prothorax ... ... Cacephatus.
HH. Metasternum extremely short ... Xynotropis.
EE. Eyes strongly emarginate ... ... Xenocerus.
BB. The transverse carina of the pronotum coincides with the base (at any rate in the middle).
C. Rostral scrobes strongly sulciform; antennæ notably shorter than head and prothorax ... Basitropis.
CC. Rostral scrobes and antennæ not as in *Basitropis*.
D. Front coxæ widely separated from one another.
E. Rostrum emarginate at apex and not forming an even surface with the head ... ... Phlœobius,
EE. Rostrum truncate at apex and forming an even surface with the head ... ... Streneoderma.
DD. Front coxæ subcontiguous or very narrowly separated.
E. Antennæ not reaching the base of the prothorax, and more or less stout.
F. Rostral scrobes visible from above ... Ozotomerus.
FF. Rostral scrobes not visible from above ... Cratoparis.
EE. Antennæ reaching much beyond base of prothorax (at any rate in male) and extremely slender.
F. Joint 3 of antennæ at least twice as long as 1 and 2 together.
G. Basal joint of hind tarsi notably longer than 2 and 3 together ... ... Exillis.
GG. Basal joint of hind tarsi about equal to 2 and 3 together... ... ... Euciodes.
FF. Joint 3 of antennæ about equal to 1 and 2 together ... ... Notæcia.
AA. Antennæ inserted on the upper surface of the rostrum.
B. Eyes rounded or widely oval, somewhat finely granulate.
C. Apex of front tibiæ with a strong spine perpendicular to the axis of the tibia ... ... Aræocorynus.
CC. Apex of front tibiæ normal.

D. Eyes very large and prominent. Antennæ equal in length to two-thirds of body ... Misthosima.
DD. Eyes much smaller and less convex. Antennæ half as long as body.
E. Front tarsi very long and wide ... ... Doticus.
EE. Front tarsi much shorter and narrower ... Aræocerus.
BB. Eyes narrow and elongate, coarsely granulate ... Aræocerodes.

EUCORYNUS.

The following species seems to belong to this genus, which has not as yet been recorded as Australian. The presence of an ante-basal carina on its pronotum together with the width of its rostrum (not narrower at its base than the head) and the sulciform character of its antennal scrobes refer it to M. Lacordaire's "groupe" *Eceloneriides*. In that "groupe" the four-jointed club of its antennæ refers it to *Eucorynus*, and I do not find anything in M. Lacordaire's diagnosis of the genus inconsistent with the characters of the insect described below, except in the antennæ of the insect being somewhat shorter than they should be according to the diagnosis.

E. Mastersi, sp. nov. Cylindricus; nigro-piceus, antennis (clava excepta) tarsisque rufis; pube picea vestitus, hac pube alba et setulis erectis piceis et aliis albis maculatim variegata; capite rostroque crebre subgrosse æqualiter punctulatis; pronoto leviter transverso, ut caput punctulato, antice fortiter angustato, lateribus sat arcuatis; elytris leviter striatis, striis fortiter nec crebre punctulatis, interstitiis planis vix perspicue punctulatis; antennis robustis prothoracis basin attingentibus, articulis 1° 2° que quam 3us paullo brevioribus, 4° 3° sat æquali, 5°—7° paullo brevioribus, 8°—11° clavam compactam depressam (hac quam articuli 4us—7as conjuncti paullo breviori) formantibus. Long., 4 l.; lat., $1\frac{3}{5}$ l.

The erect setæ are fine and recurved and are piceous or white according to the colour of the depressed pubescence among which they are situated. The white spots are,—about 5 moderately large on the head, a considerable number (all small) on the pronotum, a considerable number (all small except a larger one on the shoulder) on the front half of the elytra, and a large one and a number of small ones on the apical one-third of the elytra. The tibiæ and abdomen are prettily variegated with piceous and white pubescence, and there is much scattered white pubescence on the rostrum. The two examples before me are probably females, which may account for their antennæ being shorter than in the specimens of *Eucorynus* examined by Lacordaire, which he believed to be males.

Queensland; sent to me by Mr. Masters and Mr. Cowley.

ENTROMUS (gen. nov. *Anthribidarum*).

Caput transversum; rostrum planum depressum, quam latius sublongius, antice emarginatum, ad basin quam caput haud angustius, scrobibus obtectis foveiformibus sed oblique retrorsum (ut sulci male definiti) productis; antennæ graciles, prothoracem medium paullo superantes, articulis basalibus 2 paullo incrassatis (2° quam 1us multo longiori), 3° 2° longitudine æquali, 3°—8° gradatim brevioribus, 9°—11° clavam oblongam formantibus, 9° obconico vix transverso, 10° brevi sat transverso, 11° leviter transversim obovato; oculi parvi integri sat subtiliter granulati; prothorax vix transversus, vix inæqualis (basin versus transversim rugatus), sat convexus, antice minus fortiter angustatus, carina antebasali male definita cum rugis transversis adjacentibus subconfusa, in prothoracis lateribus vix perspicue producta; scutellum sat parvum; elytra lata depressa, inæqualia, leviter striata, striis punctulatis; coxæ anticæ appoximatæ inter se; pedes modici, inter se sat æquales; tarsi breves, articulo basali quam 2us parum longiori, 3° in 2° inserto; unguiculi subtus dente armati; metasternum modicum; pygidium (exempli typici) elytris tectum; corpus pubescens.

This genus is difficult to place in Lacordaire's scheme of classification, although it seems to me unnatural to place it far from *Tropideres*. But according to Lacordaire the fact of its rostral scrobes being certainly not simply foveiform would remove it from the "groupe" "*Tropiderides*." These are almost exactly as in *Ecelonerus* in outline, but differ in commencing in a foveiform excavation, the wall of which is interrupted at its postero-interior portion from which a shallow somewhat ill-defined sulcus emerges and simulates the deep strongly defined sulcus of *Ecelonerus*. The short wide depressed form of the type of this genus removes it, however, according to M. Lacordaire, from the *Ecelonerides*. The structure of the basal part of the pronotum is unlike that of any other Australian *Anthribid* known to me, the ante-basal carina appearing merely as one (a little more conspicuous than the rest) of several fine transverse ridges, and (though very distinct and well-defined near the lateral margins of the pronotum) becoming very faint as it approaches the middle line of the pronotum. From *Tropideres* itself it differs, *inter alia*, by the greatly elongated 2nd joint of its antennæ. I believe the specimen before me to be a male, but am not sure. *Tropideres musivus*, Er., and *albuginosus*, Er., are probably congeneric with this insect, but the descriptions of those species seem to indicate a different arrangement of the inequalities of the elytra, &c.

E. dorsoplagiatus, sp. nov. Piceus, pube picea albaque variegatus ; hac rostrum scutellum que dense vestienti et in elytris maculam magnam quadratam communem formanti; antennis pedibusque rufis, his pube picea et alba variegatis ; rostro longitudinaliter 3-carinato ; prothorace inæqualiter rugulosopunctulato, dorso obsolete inæquali ; elytrorum interstitiis 3° 5° que carinatis, parte posticali subverticali, interstitiis 3° 5° que mox ante declivitatem posticam valde callosis, inter hæc interstitio 4° rufo, interstitiis alternis (parte maculam dorsalem albam ferenti excepta) tuberculis parvis nigris instructis ; macula dorsali alba maculis parvis nigris perpaucis interrupta et ad latera crenulata. Long., $3\frac{1}{2}$ l.; lat., $1\frac{1}{2}$ l.

The common white spot on the elytra is so densely pubescent that the underlying sculpture is entirely concealed. The spot occupies in its front all the width between the seventh interstices of the two elytra but narrows a little to its apex where it occupies the width between the two fifth interstices. Its front margin is a little behind the base of the elytra but in its middle runs forward triangularly to the scutellum ; its sides are somewhat zigzagged, being cut into most conspicuously by a black spot a little behind the middle ; its apex (a little in front of the hind declivity) is arcuately and irregularly emarginate and its surface is interrupted by a few very small black spots. The red pubescence near the apex of the elytra is not entirely confined to the fourth interstices but appears as spots on some of the other interstices, and there is also a little white pubescence near the apex. The third and fifth interstices of the elytra are a little more strongly elevated near the base than in the middle of their length. It is (as already noted) very probable that *Tropideres musivus*, Er., and *albuginosus*, Er., are congeneric with this insect. Assuming them to be so this insect differs from them specifically,—from *musivus*, *inter alia*, by its considerably larger size, by its not having three fascicles of pubescence on its prothorax and by the proportions of its antennal joints,—from *albuginosus*, *inter alia multa*, by its antennæ not long enough to reach the base of the prothorax.

Victoria ; sent to me by Mr. Kershaw.

EPARGEMUS (gen nov. *Anthribidarum*).

Caput transversum ; rostrum planum, depressum, quam latius vix longius, cum capite nullo modo continuum, mox ante basin angustatum (et hic quam inter oculos caput subangustius), hinc antrorsum ad apicem gradatim dilatatum, antice truncatum, scrobibus obtectis foveiformibus sed oblique retrorsum (ut sulci male definiti) productis; antennæ sat robustæ, prothoracem medium vix superantes, articulis

basalibus 2 leviter incrassatis (2° quam basalis vix breviori), 3° quam 2us manifeste longiori, 3°—8° gradatim brevioribus, 9°—11° clavam oblongam formantibus, 9° vix transverso, 10° brevi transverso, 11° vix transverso quam 9us vix breviori; oculi sat magni, integri, sat subtiliter granulati; prothorax transversus, vix inæqualis, sat convexus, antice et postice fortiter angustatus (margine antico quam basis sat angustiori), carina antebasali bene definita retrorsum in medio angulata in prothoracis lateribus vix perspicue producta; scutellum parvum; elytra convexa, inæqualia, leviter striata, striis subtiliter sat crebre punctulatis; coxæ anticæ inter se manifeste separatæ; pedes modici, inter se sat æquales; tarsi modici, articulo basali quam 2us sat longiori, 3° in 2° inserto; unguiculi subtus dente parvo armati; metasternum minus breve (quam segmentum ventrale basale vix longius); pygidium manifestum; corpus pubescens.

This genus is difficult to place in Lacordaire's arrangement. Its rostral scrobes are much like those of *E. dersoplagiatus*, being of oblong form and running hindward obliquely on the under surface of the head, but scarcely long and deep enough to be called unreservedly "sulciform." It is difficult to say whether Lacordaire would have placed it in the groups having the base of the rostrum narrower than the head, the rostrum being scarcely (but nevertheless a little) narrower a little *in front* of the base than the head between the eyes. To me it appears that it ought not to stand far from *Tropideres*, although a strict application of Lacordaire's tabulation-characters would place it in the "*Phlœophilides*," but in the diagnosis of that "groupe" "scrobes découvertes" is one of the characters, which they certainly are not in this genus—nor does the species before me agree in its general characters or facies with any genus known to me of that group. I believe the specimen on which I have founded this genus to be a male.

E. marmoratus, sp. nov. Picea, pube nigricanti ochrea et alba variegata, antennis (clava excepta) et pedibus (plus minusve) rufescentibus; capite rostroque (his haud continue planis) crebre rugulose punctulatis, rostro longitudinaliter obsolete carinato; prothorace quam longiori fere ut 4 ad 3 latiori, supra longitudinaliter sat dense rugato, lateribus ab apice longe ultra medium arcuatim divergentibus hinc ad basin fortiter convergentibus,—elytris inter humeros et scutellum (et in humeris) callosis, interstitiis alternis leviter convexis et tuberculis nonnullis parvis instructis; corpore subtus sat æqualiter albido-pubescenti; pedibus maculatim albo- et piceo-pubescentibus.

Var pubis pallidæ colore brunneo-testaceo. Long., $2\frac{3}{5}$ l.; lat., 1 l.

In a fresh specimen the sculpture of the derm is almost entirely concealed by the pubescence, even the callosities near the base of the elytra being scarcely discernible; these are not strongly marked even in an abraded example; that between the scutellum and the shoulder is the larger, and appears feebly bifid from some points of view. The pattern formed by pubescence of different colours is extremely intricate and difficult to describe. The rostrum is entirely clothed with pale pubescence; on the head dark, pale, and ochreous pubescence are vaguely intermingled; on the pronotum the middle of the disc and base is dark with a few pale spots, the front and sides being mostly pale with some dark patches; the pubescence of the front two-thirds of the elytra is dark, irrorated with pale hairs, which are condensed (interruptedly) along some of the alternate interstices and in small spots near the sides; the apical one-third of the elytra is occupied by a large common patch (which however does not reach the margins) of pale pubescence, close to the lateral margins of which (and about their middle) is a conspicuous dark spot, while another conspicuous dark spot occupies the sutural apical space on each elytron. The small indistinct tubercles on the alternate interstices are clothed, some with ochreous, some with very dark, pubescence. In an absolutely unabraded specimen the front part of the fifth interstice appears more strongly elevated than the other interstices, but this seems to be due to longer and closer pubescence, as I do not find it in abraded specimens. The greatest dilatation of the sides of the prothorax is at the extremities of the ante-basal carina, from which point the sides converge both forward and hindward.

Victoria and N.S. Wales (specimens in the S.A. Museum are without indication of habitat, but are probably from S.A.).

ENSPONDUS (gen. nov. *Anthribidarum*).

Caput transversum; rostrum depressum planum, cum capite haud continuum, breve, transversum, quam caput haud angustius, scrobibus lateralibus, magnis, foveiformibus, obtectis; antennæ modicæ, prothoracem medium paullo superantes, articulis basalibus 2 quam sequentes robustioribus (2° quam 1us paullo longiori), 2°—5° longitudine sat æqualibus, 6°—8° paullo brevioribus, 9° quam 8us paullo longiori sed parum latiori, 10° 11° que clavam formantibus quam 9us duplo latioribus, 10° vix 11° haud transversis, 11° obconico; oculi modici integri, sat subtiliter granulati, inter se late separati; prothorax vix transversus, valde inæqualis, sat convexus, antice fortiter angustatus, carina antebasali basi sat approximata bene definita leviter antrorsum arcuata in prothoracis lateribus fere ad medium producta; scutellum parvum; elytra convexa, inæqualia, striata; coxæ anticæ

subcontiguæ; pedes modici, inter se sat æquales; tarsi sat elongati, articulo basali quam 2us sat longiori, 3° in 2° inserto; unguiculi subtus dente parvo armati; metasternum modicum (quam segmentum ventrale basale paullo longius); pygidium manifestum; corpus pubescens.

The insect for which I propose this generic name cannot be referred to any existing genus that I can discover. In Lacordaire's classification its place is in the "Groupe" *Tropiderides*. In his tabulation of the genera of that groupe its place is doubtful, the ante-basal carina of its pronotum having its convexity forward, but not nearly so strongly as in the genera he places in the aggregate distinguished by that character. Among them the tabulation would make it *Hypseus* (though its eyes are scarcely "very finely" granulate)—but *Hypseus* has very different antennæ, and eyes converging on the forehead. If the forward arch of the carina be regarded as too slight to place the insect in the *Hypseus* aggregate, Lacordaire's tabulation would make it doubtfully an *Apatenia*,—but that genus has eyes and antennæ like those of *Hypseus*,—*inter alia* joints 9 and 10 of the antennæ being equal to each other. The most striking character of the insect before me consists in there being only two joints in the club of its antennæ, joint 9 evidently belonging to the funiculus and being not much longer and wider than the eighth joint. Judging by the ventral segments (less convex and not overlapping the edge of the pygidium in one,—more convex and just covering the edge of the pygidium in another) I think I have both sexes before me, and if so there is little or no superficial sexual difference.

E. bigibbosus, sp. nov. Oblongus; piceus pube cinerea ochrea brunneaque variegata, antennis (clava excepta) pedibusque (his fusco-variegatis) rufescentibus; capite rostro pronotoque crebre subtilius rugulosis; hoc in disco paullo pone medium tuberculis 2 magnis fasciculatis ornato; elytris confertim subtilissime subaspere punctulatis, subtiliter punctulato-striatis, interstitiis alternis quam cetera vix magis elevatis (3° pone basin et in medio, 5° ante apicem, tuberculis singulis fasciculatis ornatis) et fasciculis parvis pilosis variegatis. Long., 2 l.; lat., $\frac{4}{5}$ l.

This insect is easily recognisable by the presence, on either side of the middle line of the pronotum, of a large tubercle bearing a fasciculus of hairs. There is a smaller fasciculated tubercle near the base and another about the middle of the 3rd elytral interstice, and also another near the apex of the 5th interstice. There are also very small fascicles (beneath which the derm is scarcely tuberculate) on the alternate interstices, most conspicuous on the subsutural interstice and becoming gradually less

so towards the lateral margins. The surface of a specimen in good condition is of an ashy colour, being densely clothed with brownish and whitish hairs very evenly intermingled. On this ashy ground the tubercles and fascicles show as dark spots, their vestiture being fuscous with an intermixture of ochreous. The whitish pubescence somewhat predominates along the central line of the pronotum, and in the form of a wide, very indistinct fascia, a short distance behind the base of the elytra. The pubescence so closely and thickly clothes the surface that its sculpture is entirely invisible, excepting the two large tubercles on the pronotum and the three smaller ones on each elytron. The scutellum is white. The tubercles are a little larger in some examples than in others.

S. Australia.

TROPIDERES (?)

It is with great hesitation that I refer to *Tropideres*, the minute *Anthribid* described below. Nevertheless, it seems to lack any character that would definitely exclude it from the heterogeneous aggregate of species which the genus, as characterised by M. Lacordaire, is made to contain, at any rate, unless the fact of the 2nd joint of its antennæ being much longer than the basal joint be in itself deemed sufficient. The following are its structural characters :—Head wide, rostrum scarcely transverse, at its base as wide as the head, scarcely emarginate in front, its sides parallel, its scrobes lateral foveiform and concealed, its plane not evenly continuous with that of the head ; antennæ not long enough to reach the base of the prothorax, joint 1 short, joint 2 very evidently longer than 1, 3 a little longer and more slender than 2, joints 3-8 gradually shorter, 9-11 forming an oblong but compact club, 9 longer than 10, which is transverse ; eyes fairly large and prominent, finely granulated and widely separated from each other ; prothorax gently transverse, narrowed from base to front, but not strongly, its surface even, its antebasal carina arched with convexity hindward (very close to the base but distinct from it in the middle, forming a right angle with its lateral extension which is not strongly defined and does not very nearly reach the middle of the lateral margin) ; elytra slightly gibbous close to the base on the disc, but otherwise even or nearly so, obscurely punctulate striate ; front coxæ almost contiguous to each other ; legs somewhat short and of nearly equal length ; tarsi moderately long, their basal joint considerably longer than the second ; body convex, gently oblong-ovate, pubescent ; metasternum on the middle line about as long as the basal ventral segment.

T. evanescens, sp. nov. Piceus, antennis (clava excepta) pedibusque rufescentibus ; pube sat elongata albida disperse

vestitus; supra crebre minus subtiliter (in prothorace paullo magis subtiliter) aspere punctulatus; elytris indistincte punctulato-striatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{1}{2}$ l. (vix).

I have described the characters of this insect (above) in discussing its generic position fully, and need not repeat them here. I do not think my example is abraded. Its upper surface is thinly clothed with rather long adpressed fine whitish hairs which are slightly condensed into two very indistinct fasciœ on the elytra, in front of and behind the middle. On the undersurface the pubescence is more even and slightly closer.

S. Australia; Eyre's Peninsula.

CACEPHATUS (gen. nov. *Anthribidarum*).

Caput sat breve; rostrum transversum, sat planum, cum capite haud continuum, ad apicem truncatum, ad basin quam caput haud angustius, scrobibus lateralibus magnis foveiformibus obtectis; antennæ corpus medium attingentes, robustæ, articulis basalibus 2 leviter incrassatis (2° quam 1us sublongiori), 3°—8° elongatis inter se subæqualibus, 9°—11° clavam laxam formantibus, 9° quam lato sat longiori, 10° quam 9us vix latiori sed brevi leviter transverso, 11° ovali; oculi magni integri subtilius granulati, antrorsum in fronte sat fortiter convergentes; prothorax leviter transversus, antrorsum fere a basi angustatus, æqualis, carina antebasali basi sat approximata bene definita retrorsum arcuata ad latera angulata (nullo modo acute) et antrorsum fere ad latera media producta; scutellum parvum; elytra sat convexa, late subcylindrica, sat æqualia, punctulato-striata; coxæ anticæ inter se anguste separatæ; pedes sat elongati (præsertim antici); tarsi sat elongati, articulo basali quam 2us multo longiori, 3° in 2° inserto; unguiculi subtus dente basali armati; metasternum modicum (quam segmentum ventrale basale parum longius); pygidium manifestum; corpus pubescens.

The insect for which I propose this name is evidently a member of Lacordaire's "Groupe" "*Tropiderides*," and in his tabulation of the genera it evidently stands with *Apatenia*, from which its long antennæ having their tenth joint transverse and very much shorter than the ninth, *inter alia*, distinguish it.

C. sericeus, sp. nov. Brunneus, pube albido-sericea vestitus; supra confertim subtiliter subaspere punctulatus; elytris ad basin singulatim leviter gibbis, minus fortiter striatis, striis subtilius sat crebre punctulatis, interstitiis vix subconvexis, sculptura postice obsoleta. Long., $2\frac{1}{2}$ l.; lat., 1 l.

The characters cited in the generic diagnosis need not be repeated here. There are three examples before me, all of which

appear to be somewhat abraded. It is manifest however that the whitish pubescence clothes the head and pronotum somewhat evenly. On the elytra the pubescence is interrupted by small patches of darker colour showing (in the examples before me) the derm, but I suspect that in a fresh specimen the dark spots are clothed with pubescence of the colour of the derm,—as I find some indication of such pubescence on some of the spots.

XYNOTROPIS (gen. nov. *Anthribidarum*).

Caput transversum planum ; rostrum transversum planum cum capite omnino continuum, ad basin quam caput haud angustius, scrobibus foveiformibus obtectis ; antennæ sat graciles, prothoracis basin attingentes, articulis basalibus 2 quam sequentes paullo robustiores (2° longiori), 2° 3° que inter se longitudine æqualibus, 5°—5° gradatim brevioribus, 6°—8° moniliformibus, 9°—11° clavam sat compactam formantibus, 9° 10° que inter se sat æqualibus fortiter transversis, 11° subgloboso ; oculi modici, fortiter convexi, sat fortiter granulati ; prothorax transversus sat æqualis, fortiter convexum, antice super caput fortiter anguste prominens, carina ante-basali bene definita arcuata retrorsum convexa in lateribus vix perspicue producta ; scutellum parvum ; elytra fortiter convexa, æqualia, sat breviter ovalia, punctulato-striata ; coxæ anticæ inter se bene separatæ ; pedes modici, inter se sat æquales ; tarsi breves articulo basali (tarsorum anticorum vix, posticorum manifeste) quam 2us longiori, 3° in 2° inserto ; unguiculi subtus dente acuto armati ; metasteruum brevissimum ; pygidium manifestum sat latum ; corpus supra obscure metallicum, pilis elongatis adpressis maculatim ornatum.

The shape of the insect for which I found this genus (with its strongly convex oval elytra, somewhat suggesting the thought of *Otiorhynchus*) together with the metallic gloss of its surface, renders it very easy of identification. In Lacordaire's classification it falls into the "Groupe" *Tropiderides* by virtue of the following characters :—Antennæ inserted in the sides of the rostrum, ante-basal carina of pronotum present, rostrum short flat, and at base not narrower than the head, rostral scrobes foveiform, eyes entire, sides of rostrum sub-parallel. Its structural characters seem to place it near *Tropideres*, from which it differs by, *inter alia*, its general build and extremely short metasternum which is not longer on its middle line than the shortest of the ventral segments. The metasternum is moderately short in *Tropideres*, but not nearly so short as in this genus.

X. micans, sp. nov. Ovalis ; sat nitida ; supra picea, obscure aureo- et cupreo-micans ; maculatim albido - pubescens ;

subtus nigra, vix aurata, vix pubescens ; antennis (clava excepta) pedibusque (femorum basi excepta) rufis ; capite pronotoque confertim aspere punctulatis ; elytris vix striatis, grossissime seriatim punctulatis ; sternis fere ut pronotum, abdomine subtiliter, punctulatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{1}{2}$ l.

The metallic glow on this species—though quite unmistakeable —is by no means brilliant ; it is of an evidently coppery tone on the front part of the pronotum, but very little noticeable on the rest of that segment, and on the elytra is brassy. On the example before me (which I took myself and am confident is not materially injured by abrasion) the whitish pubescence is thinly and vaguely dispersed on the head and pronotum with very little tendency to be condensed anywhere, while it clothes the scutellum densely, and on the elytra forms a wide ill-defined lateral margin and some not very conspicuous dorsal blotches which range themselves somewhat in the form of two very arcuately transverse rows (their convexity directed forward), one behind the other in front of the middle.

Tasmania ; Lake district.

BASITROPIS.

The Australian species of this genus appear to be entirely Northern in distribution and rare (as regards individual specimens) but probably numerous. I have before me six specimens which represent at least four and possibly six species. In five of them the markings of the upper surface are extremely similar while in one they are entirely different from those of the five. Three species have been described from Australia. In one of them (*solitarius*, Pasc.) the alternate interstices of the elytra are said to be "raised," which is not the case in any of the specimens before me. The descriptions of the other two are so meagre as to be almost useless. However one of my specimens agrees with the description (such as it is) of *B. ingrata*, Pasc., and may possibly be that insect,—but I cannot regard any of them as reconcilable with the description of *B. peregrina*, Pasc., which is represented as having "an obscure yellowish-grey band near the apex," consisting of pubescence, and being long., 3 l. The specimens before me (except that already mentioned as *B. ingrata ?)* are all decidedly larger and have *two* bands of pale-coloured pubescence neither of which is at all "obscure." I must consider therefore that I have not seen *B. peregrina* or *B. solitaria.*

In respect of its generic characters the diagnoses of *Basitropis* are very incomplete, owing to the want of detail as to sexual characters. Jekel (the author of the genus) does not refer to them, but his description and figure do not altogether agree with

Lacordaire's statement. The former says that the antennal club consists of three joints while the latter somewhat inconsistently states (in the generalities of the "Groupe") that in the male the club consists of four or five joints, and then in the formal diagnosis affirms that joints 6-8 are grudually transverse and that joints 9-11 form the club; and that the females can hardly be distinguished from the males except by their shorter antennæ. Turning to the specimens before me I find a slight difference in the structure of the ventral segments between two of them and the other four,—the two having those segments distincly though slightly depressed down the middle line and the apical ventral segment so related to the pygidium that when the ventral segments are looked at from directly above (the specimen being laid on its back) the edge of the pygidium can be seen beyond it, while the ventral segments of the other four are evenly convex and the apex of the apical segment just covers and conceals from sight the edge of the pygidium. The two specimens have antennæ in which joints 6-8 are so strongly and gradually dilated that it is difficult to say at which joint the club really begins (which might account for Lacordaire's contradictory statements),—while the antennæ of the other four have a distinctly three-jointed club and are I think females,—the two being males. I take it that Jekel founded the genus on the female, and that Lacordaire diagnosed a male and either failed to observe the antennæ of the female correctly, or regarded as male and female specimens that were really the males of two species.

The genus is a very well marked one among the Australian *Anthribidæ* by the unusual character of the antennal scrobes being basal and sulciform, in conjunction with the ante-basal carina of the pronotum wanting and the lateral carinæ continued nearly to the apex where they do not form an angle. I observe in all the specimens before me that the carinæ of the pronotum are finely and closely denticulate in their entire length but as this character is not referred to by Jekel or Lacordaire it may not be present in *B. nitidicutis*, Jekel (from India and Java), the typical species.

It is to be noted that M. Lacordaire describes under the name *Gynandrocerus* an African genus which he says differs from *Basitropis* only by the sexual antennal characters which approach those I have described above. If there is really no other difference between the two genera *Gynandrocerus* cannot stand.

B. relicta, sp. nov. Mas. Cylindrica; picea, pube densissima nigro-picea vestita, hac pube pallida partim testacea partim alba variegata; capite subgrosse sat crebre æqualiter punctulato; rostro fortiter transverso, inæquali, postice longitudinaliter obsolete canaliculato, antice arcuatim

emarginato; antennis robustis prothoracem medium paullo superantibus, articulis basali crasso superne nullo modo visibili, 2° quam basalis breviori minus crasso quam latiori vix longiori, 3° 4° que inter se sat æqualibus quam 2us sat longioribus, 5° quam 4us paullo breviori ad apicem dilatato quam latiori parum longiori, 6° intus ad apicem dilatato transverso quam 5us paullo breviori, 7° intus etiam magis dilatato quam longiori duplo latiori quam 6us vix breviori, 8° 7° similis sed paullo magis transverso, 9° 10° que inter se æquilatis (hoc paullo breviori) quam 8us parum latioribus, 11° breviter transversim subovato; oculis in fronte modice inter se approximatis; prothorace vix transverso, æquali, subgrosse minus profunde nonnihil acervatim punctulato, lateribus a basi longe ultra medium sat parallelis dein convergentibus; elytris striatis, striis fortiter nec crebre punctulatis, interstitiis planis; coxis anticis subcontiguis. Long., 4½ l.; lat., 1⅗ l.

The markings of the surface are caused by patches of pubescence different in colour from the ground. On the upper surface the pubescence forming the ground is of a smoky blackish tone; on the head and prothorax there are numerous small spots of testaceous brown; the scutellum is covered with white pubescence; on the elytra spots (very various in size) of white pubescence form two zones—one post-basal, the other ante-apical. The post-basal zone is an irregular common festoon of unequal spots with its ends on the shoulders; the ante-basal zone is on each elytron a transverse spot of irregularly triangular form—its base near but not touching the suture, its apex (which is truncate) near but not touching the lateral margin. Besides the two zones there are a few small white pubescent spots about the lateral margin and apex The undersurface and legs are densely clothed with pale grey very fine pubescence. On this ground coarse puncturation appears as dark spots on the sterna, there is an elongate spot of ochreous pubescence on the lateral margins of each ventral segment, and the legs are variegated with dark pubescence. Joints 9 and 10 of the antennæ are scarcely narrower than the interval between the eyes.

A specimen from N. Queensland may be the female of this species. Its antennæ are a trifle shorter than those of the described male and distinctly more slender, their basal 7 joints cylindric and not differing much in size except in the 4th being somewhat the longest, the 8th is distinctly dilated and transverse, joints 9—11 forming a club, and much like joints 9—11 of the male, but less dilated. The only differences that I observe (not already mentioned) from the male consist in the eyes being a little less approximate to each other, and the elytra having

(besides the zones of white pubescence) numerous small white pubescent spots sprinkled over the whole surface. On the whole I incline to think this specimen the female of a species distinct from that of which the male is described above.

An example from Port Darwin agrees with the above description of the male except in its smaller size (Long. $3\frac{3}{4}$ l.), and in the pale pubescence of its elytra being of a distinctly ochreous tone.

N. Queensland.

B. pallida, sp. nov. Fem. Sat cylindrica, postice paullo angustata; picea, pedibus antennisque rufescentibus; pube adpressa densissima testacea alba et fusca læte intermixta vestita; capite subgrosse sat crebre æqualiter punctulato; rostro sat fortiter transverso, longitudinaliter indistincte carinato, antice leviter emarginato; antennis minus robustis prothoracem medium paullo superantibus, articulis basali crasso superne nullo modo visibili, 2°—4° inter se sat æqualibus quam basalis longioribus, 5°—7° inter se sat æqualibus quam 4us sat brevioribus, 8° quam 7us paullo longiori antrorsum leviter dilatato, 9°—11° clavam formantibus, 9° 11° que inter se sat æqualibus vix transversis, 10° brevi fortiter transverso; oculis in fronte minus approximatis; prothorace sat æquali (longitudine latitudini æquali), fere ut caput punctulato, lateribus a basi longe ultra medium leviter (dein sat fortiter sinuatim) convergentibus; elytris leviter striatis, striis fortiter sat crebre punctulatis; corpore subtus pedibusque sat æqualiter dense albido-pubescentibus; coxis anticis inter se approximatis sed haud contiguis. Long., $4\frac{1}{2}$ l.; lat., $1\frac{1}{2}$ l.

The prevailing pubescence of the upper surface is of a pale testaceous brown colour; on this ground, white pubescence is distributed as follows,—dispersedly on the head and rostrum,—on the pronotum a line down the middle and an elongate patch on either side near the margins,—on the elytra a large humeral patch limited by an oblique line from the scutellum to the lateral margins at about a third of its length from the base, some small spots along the suture and lateral margins, and a large somewhat arcuate patch near the apex; pubescence of very dark colour forms the lateral margins of the pronotum and is continued a short distance along the margins of the elytra, forms a large basal spot in the basal white patch, a very small spot on the third interstice slightly behind the middle (just in front of the hindmost white patch) and a larger spot on the third interstice near the apex (within the arch of the hindmost white patch).

The colour and distribution of the markings in this species are entirely different from those of the other described species of

Basitropis (at any rate of all the Australian ones, and all other known to me). In respect of other characters not likely to be sexual it differs from *B. relicta*, *inter alia*, by its somewhat larger and less cylindric shape, the feeble emargination of the front of its rostrum, the more elongate form of its prothorax which is distinctly (though not much) narrower across its middle than across its base (in *relicta* that segment is if anything wider across its middle than its base), its evidently narrower rostrum, and the more evident interval between its front coxæ. It is to be noted, however, that in neither of the above species are the front coxæ separated by a continuous process of the prosternum.

Port Darwin (N. Territory of S. Australia). Taken by the late Dr. Bovill.

STRENEODERMA (gen. nov. *Anthribidarum*).

Caput transversum; rostrum transversum supra sat planum, ad apicem truncatum, ad basin quam caput haud angustius, scrobibus foveiformibus obtectis; submentum planatum profunde triangulariter emarginatum; antennæ graciles, articulis basalibus 2 quam sequentes robustioribus (2° breviori), articulis 3°—8° gradatim brevioribus, 9°—11° clavam distinctam formantibus, hac laxe articulata; oculi magni, fere integri, sat convexi, minus fortiter granulati; prothorax fortiter transversus, transversim fortiter convexus, carina antebasali nulla, carina basali ad latera angulata et antrorsum ad latera media producta; scutellum parvum; elytra sat brevia, striata, postice subverticalia; coxæ anticæ inter se latissime remotæ; pedes modici, anticis quam ceteri longioribus; tarsorum anticorum articulus basalis quam ceteri conjuncti parum (posteriorum multo) brevior, 3° in 2° inserto; unguiculi subtus dente parvo armati; metasternum breve; pygidium manifestum, subquadratum.

According to M. Lacordaire's classification the small insect for which I found this genus is a member of the "Anthribides vrais," by virtue of the following characters in combination:—Antennæ inserted on the sides of the rostrum, carina of pronotum basal, rostrum of subparallel form, body not elongate-cylindric. In that group it is distinguishable by the following characters:—Front coxæ very widely separated (more widely than in *Phlœobius*), rostrum truncate at its extremity, antennæ and legs extremely like those of *Arœocerus*. The outline of the prothorax and elytra is not unlike that of *Ceutorrhynchus*. I am uncertain as to the sex of the examples before me. The front margin of the eye itself forms the hind wall of the scrobe.

S. planatum, sp. nov. Piceum vix rufescens, antennis (clava excepta) et tarsorum apice testaceis; sat opacum; sparsim

minus perspicue cinereo-pubescens; supra confertim subtilissime (haud multo aliter quam *Arœocerus fasciculatus*, De Geer) subaspere punctulatum; rostro cum capite continuo; prothorace vage inæquali; elytris striatis, in parte suturali conjunctim planatis; pedibus pube cinerea plus minusve perspicue maculatis; antennis prothoracem medium paullo superantibus, clava quam articuli 4us—8us conjuncti vix brevioribus, articulis 9° vix (10° manifeste) transverso 11° obconico quam latiori parum longiori. Long., $1\frac{1}{5}$ l.; lat., $\frac{4}{5}$ l. (vix).

There are indications on the specimen before me of the whitish hair-like scales on the upper surface having been in places condensed into somewhat conspicuous blotches which are chiefly about the middle of the front of the prothorax, on the scutellum and about the sides of the prothorax and elytra, especially near the shoulders, and it is possible some such markings may have been rubbed off, although the presence of the even thinly distributed pubescence seems inconsistent with the surface being much abraded. A vague depression runs down the middle of the prothorax longitudinally, on either side of which slightly behind the middle is a distinct transverse gibbosity. The fourth interstice of each elytron is more conspicuous than the other interstices, chiefly through the space between the fourth interstices of the two elytra (including the suture) being flattened. Most of the interstices are furnished in some part of their length with unequal feebly raised tubercles. The head and rostrum together form a perfectly even flattened surface without any trace of distinction *inter se*. The insect has much of the structure of *Arœocerus* but with the rostrum and scrobes of a true *Anthribid*.

Victoria.

S. contemptum, sp. nov. Fere ut præcedens (*S. planatum*) coloratum et pubescens sed pedibus dilutioribus et elytris ad apicem rufis; rostro cum capite continuo; prothorace æquali, lateribus mox ante basin manifeste sinuatis, angulis posticis extrorsum manifeste acutis; elytris æqualiter convexis, interstitiis vix perspicue tuberculatis; antennis prothoracis basin attingentibus, clava quam articuli 3us—8us conjuncti vix breviori, articulis 9°—11° elongatis (10° quam 9us et 11us manifeste breviori. Long., $1\frac{1}{5}$ l.; lat., $\frac{4}{5}$ l. (vix).

This species closely resembles the preceding in general appearance, but is certainly distinct. The pronotum is devoid of inequalities and the elytra have no longitudinal flattening on the sutural region, their interstices also being all but devoid of inæqualities. The sides of the prothorax are quite strongly incurved just in front of the base, and the hind angles of that

segment are very distinctly pointed outward, neither of which characters is found in *S. planatum*. The antennæ are considerably longer in *S. contemptum* than in *S. planatum*, their club especially, of which all the joints are at least twice as long as wide. It is not improbable that these antennal differences may indicate that my example of *contemptum* is a male, and that of *planatum* a female, but they are certainly not the sexes of one species. There is scarcely any indication of the pubescence being condensed in patches on the example before me, but I do not attach much importance to this character, as I find that the condensed long scales on the small *Anthribidæ* are very easily rubbed off, and therefore very unreliable for identification of species.

N. Queensland; given to me by Mr. Koebele.

NOTŒCIA (gen. nov. *Anthribidarum*).

Mas. Rostrum transversum, depressum, ad apicem arcuatim emarginatum, ad basin quam caput haud angustius, scrobibus lateralibus foveiformibus apertis; antennæ quam corporis dimidium sublongiores, graciles, clava minus laxe 3-articulatis, articulis basalibus 2 quam sequentes robustioribus (2° longiori), 3° 4° que inter se sat æqualibus, 5°—8° quam 4us sat brevioribus, 9° obconico 8° longitudine æquali, 10° brevi transverso, 11° quam 9us vix longiori; oculi magni, sat subtiliter granulati, antice sat profunde emarginati, supra inter se approximati; prothorax transversus æqualis, carina antebasali nulla, carina basali ad latera angulata et antrorsum ultra prothoracis medium producta; scutellum parvum; elytra subcylindrica brevia (quam conjunctim latiora circiter ut 10 ad 7 longiora), ad basin leviter gibbosa, striata, postice verticalia; coxæ anticæ subcontiguæ; pedes modici; tarsi antici quam tibiæ haud breviores, articulo basali quam ceteri conjuncti sublongiori; unguiculi subtus dente parvo armati; pygidium manifestum; corpus pubescens.

The insect for which I propose this generic name falls into M. Lacoradire's group "*Anthribides vrais*" by virtue of the following characters:—Antennæ inserted on the sides of the rostrum, carina of pronotum basal, rostrum parallel-sided, body not elongate. The genus, however, can hardly be placed in M. Lacordaire's tabulation of the genera of that group as its two main divisions are "front coxæ widely separated, rostrum strongly emarginate in front," and "front coxæ subcontiguous, rostrum not or scarcely emarginate in front," whereas in this genus the front coxæ are subcontiguous and the rostrum is quite strongly emarginate in front. Its most striking characters are found in its very large eyes, strongly emarginate in front, and

separated from each other on the forehead by a space only about one-third of the width of the rostrum, and its open scrobes which cut the upper surface of the rostrum sufficiently to be both visible when viewed from above. This form of scrobes is an approach to their form in the *Arœocerides*, in which, however, both scrobes are *entirely* visible when viewed from above, and the interval between them is less than the interval between the eyes, whereas in this genus (and others with the scrobes visible and lateral) the interval between them is greater than that between the eyes and only a small part of both scrobes can be seen together.

N. reticulata, sp. nov. Piceo-rufa, pube albida variegata; hac in rostro vage, in capite medio longitudinaliter (et circa oculos) lineatim, in prothorace vage, in scutello confertim, in elytris reticulatim et maculatim, in pygidio ita ut annulos 2 format, in sternis abdominis lateribus pedibusque (in his interrupte) sat dense, disposita; antennarum clava et pedum nonnullis partibus obscuris; corpore toto (pube haud abrasa) confertim subtilissime subaspere punctulato; prothorace fortiter transverso, antice minus fortiter angustato, lateribus parum arcuatis; elytris indistincte (latera versus magis perspicue) striatis, striis vix perspicue punctulatis. Long., $1\frac{3}{4}$ l.; lat., $\frac{7}{10}$ l.

On this pretty little species fine dense red-brown very short pubescence covers the upper surface so closely that there is little apparent sculpture; but, no doubt, if the pubescence were removed underlying sculpture would appear. On the red-brown derm-pubescence there is variegation formed by longer pubescence of ashy-white colour. This longer pubescence is vaguely scattered over the rostrum and pronotum and densely clothes the small scutellum; on the head it forms fine lines and on the elytra it runs in fine sinous longitudinal lines, which are here and there transversely connected,—some of the transverse connections (especially between the third and fourth longitudinal lines) being dilated into conspicuous blotches. The derm-pubescence is more red than brown on the head and becomes gradually less red and more brown hindward. The inequalities of the elytral surface (which are likely to be a generic character) are feebly defined, and best observed by looking at the insect from the side when there is seen to be feeble gibbosity near the base with irregular depression behind the gibbosity, then a scarcely elevated longitudinal ridge on the third interstice slightly behind its middle and a still slighter elevation a little nearer the base on the subsutural interstice while between the ridge on the third interstice and the lateral margin the surface is scarcely visibly depressed.

N. Queensland; sent to me by the late Mr. Cowley.

MISTHOSIMA.

The species described below may be referred I think to this genus which was founded by Mr. Pascoe to include two insects from Borneo. It agrees very well with the characters attributed to the genus by its author and if not a true congener of the already described species must represent a closely allied new genus distinguishable by characters not mentioned in the diagnosis. The only discrepancies are slight, consisting in the second antennal joint being scarcely shorter than the basal one and the metasternum not quite so short as in *Arœocerus* (as, according to description, it should be) but these alone scarcely justify the formation of a new genus.

M. dorsonotata, sp. nov. Oblonga; picea, antennarum basi labro femoribus tibiisque testaceis; pube densa fusca vestita, hac pube cinerea concinne maculatim variegata; antennarum articulo 2° quam 1us vix breviori; supra confertim aspere subtiliter (in elytris quam alibi paullo minus subtiliter) punctulata; elytris subtilissime striatis; pube in corpore subtus quam in corpore supra magis cinerea. Long., $1\frac{3}{4}$ l.; lat., $\frac{3}{5}$ l.

The ashy or whitish pubescence of the upper surface is distributed as follows:—On the head it predominates (the fuscous colour forming two longitudinal lines dilated in front and behind); on the prothorax it is most conspicuous on the sides and middle line; on the elytra it forms numerous small clearly defined evenly distributed spots, three somewhat larger placed transversely across the base, and a common much larger triangular patch (its apex pointing forward) about the middle of the suture.

North Queensland.

DOTICUS.

This genus is unsatisfactorily close to *Arœocerus*. Its author (Mr. Pascoe) says that it differs from *Arœocerus* by the greater length of its front legs, the greater width of its tarsi and the deeper insertion of the third tarsal joint in the second. To this it may be added that (so far as my experience goes) the species with the legs of *Doticus* are considerably larger than any with the legs of *Arœocerus*. Nevertheless I am of opinion that the generic distinction of the two cannot be maintained. I have before me a specimen which is certainly I think *D. palmaris*, Pasc. *Metadoticus*, Olliff, seems to be quite indistinguishable from *Doticus*. The name used by Olliff seems to have been suggested by the author of *Doticus*, and yet there is nothing in his diagnosis to distinguish it from that of *Doticus*, nor does he mention *Doticus*, but compares *Metadoticus* to *Ethneca*, with which *Doticus* has so little connection that it would be hard to find two

Anthribidæ much less allied to each other than they are. Olliff's species (the too common *Metadoticus pestilens*) is quite unmistakable and the insect generally called by that name agrees so perfectly with Olliff's somewhat full specific description that it seems impossible we can be mistaken in our identification of *M. pestilens*. I can find no generic distinction between *M. pestilens* and the insect mentioned above as *D. palmaris*.

D. æqualipennis, sp. nov. Late ovalis; piceus, pube brunnea maculatim vestitus; supra confertim subtilissime subaspere punctulatus; prothorace minus fortiter transverso, antrorsum a basi arcuatim fortiter angustato, æquali; elytris æqualibus, striatis, striis sat fortiter nec crebre punctulatis, interstitiis planis. Long., $3\frac{1}{2}$ l.; lat., $1\frac{3}{5}$ l.

The head is entirely covered with bright brown pubescence except a longitudinal vitta of dark brown pubescence on either side of the middle; the pronotum is confusedly variegated with bright brown pubescence on the piceous derm; on the elytra the piceous derm is variegated by bright brown pubescence arranged longitudinally on the interstices, the pubescence being continuous (on the specimen before me, which is evidently not at all abraded) on the front one-fifth part of most of the inner seven interstices and nearly so on about the hinder half of the inner five interstices, but on the rest of the interstitial surface it takes the form of small square spots; where the pubescence is not of bright brown colour it is scarcely less dense, but is of the colour of the derm; that of the under surface is uniformly of a pale ashy colour. This species seems to agree absolutely with *D. palmaris*, Pasc., and *M. pestilens*, Oll., in its structural characters. It is very distinct from both, as a species, owing to the even surface of its pronotum and elytra.

Queensland; sent to me by Mr. G. Masters as No. 77.

ARÆOCERUS.

This genus is somewhat numerously represented in Australia, although no species of it have yet been recorded in Australia in such fashion as to be capable of confident identification. In 1835 Boisduval published a diagnosis consisting of nine words of *Anthribus sambucinus*, which he thought might be a variety of *Anthribus coffeæ*, Fab., and the latter (according to Lacordaire) is identical with *Aræocerus fasciculatus*, De Geer. Doubtless therefore *A. sambucinus* is an *Aræocerus* and it now stands in our Catalogues as a variety of *A. fasciculatus*. I have not access to De Geer's description of *A. fasciculatus*, but I know the insect as a Hawaiian *Aræocerus* that the eminent Coleopterist Dr. Sharp named for me. I have examples from tropical Queensland of an *Aræocerus* that I cannot separate

from *fasciculatus*, but I do not think it likely to be *sambucinus*, Boisd., as the habitat of the latter is presumably the neighbourhood of Sydney, where I have taken an *Arœocerus* perfectly distinct from (though closely resembling superficially) *fasciculatus*, and which I have little doubt is the true *sambucinus*.

The species of this genus are very difficult to deal with on account of their pubescence being extremely easily rubbed off, —so that it is necessary to rely almost entirely on structural characters for identification and the descriptions of markings can be but little trusted for identifying any but very fresh specimens,—and also from the absence (alluded to by M. Lacordaire) of any readily available character for determining the sex of a specimen. In studying a considerable number of examples of *Arœocerus* from widely separated parts of Australia I find, owing to the difficulties mentioned, a certain number of forms which I believe to represent additional species, but which I hesitate to treat as certainly distinct, and in the following pages I have limited myself to the well-marked species.

The characters of some of the *Arœoceri* described below do not altogether agree with Lacordaire's diagnosis of the genus, but I am satisfied that the characters in question are not truly generic.

The following tabulation will assist in the determination of the *Arœoceri* known to me as Australian.

A. Each elytron having a well developed basal crest — *bicristatus*, Blackb.
AA. Elytra even at the base,—or nearly so.
B. Ninth joint of antennæ not or scarcely longer than tenth.
C. Legs dark... ... ... — *Koebelei*, Blackb.
CC. Legs of pale colour ... ... — *fasciculatus*, DeG.
BB. Ninth joint of antennæ notably longer than tenth.
C. Antennæ long enough to reach the base of the prothorax.
D. Antennal club moderately robust (about as much so as in *D pestilens*, Olliff) ... — *sambucinus*, Boisd.
DD. Antennal club notably more slender ... — *lindensis*, Blackb.
CC. Antennæ not long enough to reach base of prothorax ... . — *asperulus*, Blackb.

A. bicristatus, sp. nov. Ovalis, minus latus; sat convexus; picea, pube læte brunnea dense vestita, hac pube cinerea et nigricanti variegata (hac in pronoto ad latera et medium et in elytris maculatim, illa in elytris sparsissime maculatim, dispositis); antennis prothoracis basin attingentibus, testaceis, clava fusca, articulo 9° quam 10us vix longiori; prothorace minus fortiter transverso, antice fortiter angustato, lateribus leviter arcuatis, basi bisinuata, supra crebre aspere punctulato, angulis posticis acutis; elytris crebre aspere

(quam pronotum vix magis subtiliter) punctulatis, striatis striis puncturis sat magnis leviter impressis, interstitiis tuberculis seriatim instructis, his vix elevatis nisi in interstitio 3° in quo tuberculus anticus cristam longitudinalem bene elevatam format (fere ut *Dotici pestilentis* Olliff sed minus elevatam); femoribus ad apicem haud ut dens productis; tarsis sat fortiter (fere ut *A. fasciculati*, De Geer) elongatis.

Maris tibiis anticis intus ciliatis; tarsis anticis quam feminæ multo robustioribus, et setulis elongatis vestitis. Long., 1—1$\frac{3}{5}$ l.; lat., $\frac{2}{5}$—$\frac{3}{5}$ l.

Readily distinguishable among the Australian *Arœoceri* by the crest-like tubercle near the base of the third interstice of its elytra. In a fresh specimen the alternate elytral interstices bear a number of rather conspicuous little tubercles covered with pubescence (on some of the tubercles darker, on others lighter, than that of the general surface) which is a little longer than of the general surface, while the basal margin of the elytra is entirely and narrowly bordered with red-brown pubescence. In abraded specimens the interstitial tubercles are much less conspicuous. Compared with *Doticus palmaris*, Pasc., and *pestilens*, Olliff, the present species is, *inter alia*, very much smaller and narrower.

Queensland; given to me by Mr. Koebele.

A. Koebelei, sp. nov. Sat late ovalis; sat convexus; nigricans, prothorace antice et postice et pedibus plus minusve rufescentibus, antennis (clava excepta) rufis; pube albo- vel rufo-cinerea in pronoti parte anteriori et in elytrorum partibus scutellari humeralique et interstitiis alternis maculatim vestitus; antennis prothoracis basin attingentibus, articulo 9° quam 10us vix longiori; prothorace fere ut *A. bicristati* sed magis transverso; elytris fere ut *A. bicristati*, sed interstitio 3° basin versus haud gibboso; femoribus ut *A. bicristati*; tarsis quam *A. bicristati* magis robustis, minus elongatis. Long., 1$\frac{1}{2}$—2 l.; lat. $\frac{3}{5}$—1 l.

Maris tibiis anticis leviter sinuatis, intus ciliatis et subtiliter crenulatis; tarsis anticis breviter pilosis et leviter dilatatis.

Readily distinguishable from its Australian congeners known to me by its almost black colour, and its dark legs. It is a much broader and more robust species than *A. bicristatus*. In a fresh specimen the whitish pubescent spots stand out very conspicuously on the blackish general surface. They form a slight mottling on the head, and front and base of the pronotum, an elongate patch including the scutellum, a patch (of somewhat reddish tone) on each shoulder, and a number of smal spots on the alternate inter-

stices of the elytra. I have two examples sent to me by Mr. Masters which may possibly represent a closely allied distinct species, as they are of even broader and more robust form than the type, with the pale spots on the elytra evidently (though only slightly) raised, but their colours and markings agree so exactly with those of the type that I am disposed to think them merely fine and highly developed examples of the one species.

Queensland; given to me by Mr. Koebele.

A. lindensis, sp. nov. Mas. Brevis; latus; sat convexus; rufo-brunneus, sternis et antennarum clava piceis; pube cinerea in partibus vestitus sicut partes haud pubescentes ut notulæ obscuræ apparent (harum præsertim manifesta est in elytris notula magna basalis subsuturalis,—in exemplis nonnullis cum alterius elytri notula conjuncta); antennis prothoracis basin vix attingentibus, articulo 9° quam 10us sesquilongiori, clava sat gracili; prothorace sat transverso, confertim subtilius granulato-punctulato, antice angustato, lateribus modice arcuatis, angulis posticis (superne visis) sat rectis; elytris striato-punctulatis, interstitiis confertim aspere punctulatis; femoribus subtus (anticorum parte media acute trispinosa) mox ante apicem profunde emarginato, apice ipso deorsum (ut dens parvus) acuto; tibiis anticis intus subtiliter manifeste crenulatis; tarsorum anticorum articulo basali sat breve setulis elongatis vestito; coxis anticis inter se anguste separatis. Long., 1—1$\frac{1}{5}$ l.; lat., $\frac{1}{2}$—$\frac{3}{5}$ l.

This species is at once separable from the preceding two (*bicristatus* and *Koebelei*) and from *fasciculatus*, De G., by the peculiar structure of the front femora of its male. The markings (resulting from the presence of spaces on which the ashy pubescence is wanting) form a vague mottling on the prothorax and elytra, of which the most conspicuous feature is a rather large basal elytral spot close to the scutellum on either side (the two spots united in some examples). This basal elytral spot appears very dark and well defined when the insect is looked at obliquely from in front, but is much less noticeable when looked at from behind. The other parts of the elytra devoid of ashy pubescence appear as small spots running into indistinct oblique fasciæ,—in some examples their fascia-like disposition scarcely discernible.

Although I have taken about seven specimens of this insect, they are all males.

S. Australia (Eyre's Peninsula).

A. sambucinus, Boisd. Præcedenti (*A. lindensi*) affinis; minus brevis; antennarum clava magis robusta; elytris ad basin haud vel vix perspicue plaga obscura notatis; tarsorum anticorum articulo basali sat majori.

Maris femoribus tibiisque anticis fere ut *A. lindensis*, sed spinis (in illius parte media subtus positis) multo brevioribus vel granuli formibus; tarsorum anticorum articulo basali paullo magis robusto et setulis elongatis vestito.

Feminæ femoribus anticis ad apicem vix deorsum productis, tibiis intus haud crenulatis, tarsis haud setulis elongatis vestitis. Long., $1\frac{1}{2}$—$1\frac{3}{5}$ l.; lat., $\frac{7}{10}$ l.

Distinctly larger than *A. lindensis* and without (or almost without) any indication of the dark blotches at the base of the elytra. Differs from the male of *lindensis* (and no doubt from the female also) by the much less slender club of its antennæ and the notably larger basal joint of its front tarsi. The male differs from the male of *A. lindensis* by the sexual ante-apical emargination and apical tooth of its femora being present only in the front pair and by the very much feebler inequalities on the middle part of the undersurface of its front femora. Differs from *fasciculatus*, De G. *inter alia* by its sexual characters.

Widely distributed in Southern Australia.

A. asperulus, sp. nov. Ovalis; minus latus; sat convexus; piceus, pronoto antice elytris tibiisque dilutioribus, antennis (clava excepta) rufis; pube cinerea sparsim (exemplorum visorum haud maculatim) vestitus; antennis prothoracem medium parum superantibus, articulo 9° quam 10us sesquilongiori; prothorace sat fortiter transverso, ante basin anguste transversim depresso, in ceteris partibus æquali nullo modo canaliculato, confertim minus subtiliter aspere punctulato, angulis posticis extrorsum manifeste prominulis; elytris striatis, striis cancellato-punctulatis, interstitiis aspere subfortiter crebre punctulatis; femoribus mox ante apicem subtus profunde emarginato, apice ipso deorsum (ut dens parvus) acuto; tarsis quam *A. fasciculati*, De Geer, sat brevioribus sat robustioribus; coxis anticis inter se sat late separatis. Long., $1\frac{1}{2}$ l.; lat., $\frac{7}{10}$ l. (vix.).

I am not sure that a new genus ought not to be formed for this insect on account of its short antennæ, comparatively widely separated front coxæ, and curiously shaped femora, but as in the preceding two species the first of the above characters is approached and the last is even exaggerated, I think they may be regarded as a gradual divergence from the typical characters of *Arœocerus* rather than the indication of a really distinct genus. The present species owing to its elongate oval form and pubescence not condensed into spots (I do not think the two specimens before me are abraded) has scarcely the facies of *Arœocerus*, but the preceding two species (which are undoubtedly allied to it) have quite the facies of *Arœocerus*. The insertion of

the antennæ is altogether as in a typical *Arœocerus* in being slightly nearer to the middle line of the head and rostrum than is the inner margin of the eye. The specimens before me are females. Their antennal club is short and moderately stout.

S. Australia; Eyre's Peninsula.

ARÆOCERODES (gen. nov. *Anthribidarum*).

Caput transversum; rostrum transversum, supra sat planum, ad apicem truncatum, ad basin quam caput haud angustius, scrobibus ut *Arœoceri;* antennæ prothoracis basin paullo superantes, sat graciles, articulis basalibus 2 quam ceteri robustioribus (2° longiori), 8° ad apicem leviter dilatato, 9°—11° clavam elongatam laxe articulatam formantibus; oculi oblongo-ovales haud (vel vix) emarginati, grossissime granulati; prothorax transversus, æqualis, antice modice angustatus, carina antebasali nulla; carina basalis ad latera angulata et antrorsum brevissime producta; scutellum angustum; elytra convexa, æqualia, striata, striis fortiter nec crebre punctulatis; coxæ anticæ sat contiguæ; pedes modici, anticis quam ceteri longioribus; tarsi modici, articulo 3° in 2° profunde inserto; unguiculi subtus dentati.

Structurally near to *Arœocerus*, but of evidently more cylindric form and with narrow, elongate, very coarsely granulated eyes. The species is the smallest *Anthribid* that I have seen.

A. lilliputanus, sp. nov. Pallide testaceus, antennarum clava obscura; pube albido-testacea vestitus, hac in elytris trifasciatim disposita; capite prothoraceque confertim subfortiter granulatis; prothoracis angulis posticis (superne visis) retrorsum acutis. Long., $\frac{2}{3}$ l. (vix); lat., $\frac{3}{10}$ l.

The characters not mentioned in the above specific description are fully stated in the generic diagnosis and need not be repeated. Its excessively minute size will at once distinguish this insect from all the previously described Australian *Anthribidæ*.

N. Queensland; sent to me by the late Mr. Cowley.

PHYTOPHAGA.

CLEPTOR.

I have before me examples of both species of this genus, named by Mr. Jacoby and agreeing so well with Lefèvre's descriptions that I can feel no doubt of their identity. But I think the genus is not rightly placed next to *Edusa* as it seems to me very much closer to *Colaspoides*, of which it entirely reproduces the prosternal characters. M. Lefèvre indeed characterises the *Edusitæ inter alia* by the phrase "prosternum oblongum" and yet places *Cleptor* in that group in spite of his diagnosis of its

prosternum as being "latius quam longum." I can really find no very marked character to distinguish *Cleptor* from *Colaspoides* except in its eyes being almost without sinuation. M. Lacordaire distinguished the "*Edusites*" from the "*Endocephalites*" (containing *Colaspoides)* by the presence in the former of transverse elytral rugosities, but this distinction is not reliable. M. Lefèvre mentions the rugosities as only "generally" present in the former group, M. Lacordaire himself admits that in some *Edusites* "elles peuvent passer inappercues," and I possess species of *Colaspoides* in which they are not quite wanting. The groups then (as characterised by M. Lacordaire) cannot be maintained; nor does M. Lefèvre, though accepting the groups, suggest any better distinction. Whether it would be practicable and desirable to regard *Edusa* and *Colaspoides* as the typical genera of two groups (which would have very different contents from those mentioned above) distinguished from each other by the form of the prosternum I must leave to the decision of authors better equipped than I am for studying a large cosmopolitan collection of *Eumolpides*, but however the genera should be grouped I am convinced that *Cleptor* ought to stand close to *Colaspoides*. Along with the examples of *Cleptor* mentioned above Mr. Jacoby sent me a specimen as *Colaspoides xanthopus*, Har., which appears to be correctly named, but is certainly, I think, a *Cleptor*. It is identical with a specimen I received from the Chapuis' collection ticketed "*Neotaxis fulgida*." I cannot find that Dr. Chapuis ever published such a genus and species. Possibly the genus *Cleptor* was published at such time as to forestal *Neotaxis*,—but at any rate it indicates that Dr. Chapuis did not place Harold's insect in *Colaspoides*.

The following is a new species of *Cleptor*.

C. Haroldi, sp. nov. Glaber, supra cyanescens viridi-micans, subtus niger (certo adspectu aureo-vel cupreo micans), antennis ferrugineis apicem versus obscurioribus, pedibus piceis plus minusve rufescentibus; pronoto crebre subtilius punctulato, puncturis singulis oblongis; scutello lævi; elytris in disco medio crebre fortiter (in ceteris partibus minus crebre minus fortiter) vix seriatim punctulatis, pone basin vix manifeste impressis, pone humeros certo adspectu transversim leviter rugatis. Long., $2\frac{1}{2}$ l.; lat., $1\frac{3}{5}$ l.

Compared with *C. rufimanus*, Lef., the pronotum is considerably more closely punctulate, with the lateral puncturation much more evidently offering a longitudinally rugate appearance, while the puncturation of the elytra is much finer near the lateral margins; the form also is notably less convex. Compared with *C. inermis*, Lef., and *xanthopus*, Har., *inter alia multa* there is scarcely any indication of a transverse impression near the base of the elytra.

N. Queensland.

NEOCLES.

N. innocuus, sp. nov. Minus elongatus; piceus plus miuusve metallico-micans, capite antennis palpis femoribus tibiis tarsisque rufis; pube aureo-brunnea (hac nonnihil maculatim disposita) vestitus; capite sat profunde ruguloso; prothorace quam longiori vix latiori, antrorsum leviter angustato (nihilominus, superne viso, fortiter angustatus apparet), antice valde producto, fortiter granulo so-ruguloso, longitudinaliter leviter late sulcato, lateribus minus arcuatis, angulis anticis sat rectis posticis obtusis; elytris subseriatim confertim punctulatis et granulatis, nullo modo costatis. Long., $3\frac{1}{5}$ l.; lat., $1\frac{3}{5}$ l.

This genus is remarkable among the *Eumolpides* by the presence of prosternal channels for the reception of the antennæ, and by a facies very unlike that of a typical *Eumolpid*. Only one species has been described hitherto—*N. sulcicollis*, Chp., of which I possess the type. Owing to the front margin of the pronotum being very strongly produced forward in the middle the prothorax appears (when viewed from above) to be very much more narrowed in front than it really is, and owing to the extero-anterior angles of the prosternum being strongly produced the pronotum (viewed in a somewhat oblique direction which discloses the prosternal angles) appears to have spiniform front angles. The present species differs from *N. sulcicollis* by, *inter alia*, its non-costate elytra, and the sides of its prothorax (though slightly serrate, yet) without a defined median angular projection.

N.S. Wales; Tweed R. district.

CASSIDIDÆ.

CASSIDA.

C. profunde-striata, Spaeth. The description of this insect (Verh. Ges. Wien., 1899, p. 216) reads as if it might well be founded on a specimen of *C. mera*, Germ., which varies from the type in having its elytra more or less spotted with black. I have taken in company specimens with and without dark spots. Herr Spaeth does not mention *C. mera*, to which his insect is at any rate extremely close.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia

FOR 1899-1900.

ORDINARY MEETING, NOVEMBER 7, 1899.

W. L. CLELAND, M.B. (President) in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S. exhibited a ferruginous sandstone of peculiar form, and some calcareous travertine, the latter showing remarkable weathering; both specimens from the Lake Eyre distict. MR. S. DIXON some specimens from Mount Morgan mine, and described the conditions under which they were found. Also he gave a description of the labour-saving machinery by which 20,000 tons of ore were treated on the mine per month, and referred to the liberal and enlightened policy pursued by the directors by which they were enabled to attract the best available talent to their service. He also showed some rich tin ore specimens from North Queensland, and a water bag made by the natives of Queensland from the bark of a tree not identified. MR. TEPPER drew attention to botanical experiments by Von Herzule in 1875, and by W. H. Preuss more recently, which tended to prove that plants must manufacture their own mineral matter.

PAPER.—"Notes on the Cliffs Separating Aldinga and Myponga Bays" by EDWARD VINCENT CLARK, B.Sc.

ORDINARY MEETING, DECEMBER 5, 1899.

W. L. CLELAND, M.B. (President) in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., exhibited a beryl lying in a matrix of quartz from near Williamstown. A piece of chalcedony with dentritic markings, and a small spherical body of low specific gravity and well defined marking which was picked up near the sea at Bunbury, W.A. A. PURDIE, M.A., showed specimens of fossiliferous cal-

careous rock from the vicinity of Cape Jervis from a raised beach above the Till, and mentioned that Second Valley was well worthy a visit, being evidently grooved out of the glacial till, and exhibiting many travelled boulders.

PAPERS.—"Descriptions of new Micro-lepidoptera," by DR. JEFFERIS TURNER. "A Refutation of the Doctrine of Homotaxis," by PROF. RALPH TATE, F.G.S. (Withdrawn.)

ORDINARY MEETING, APRIL 3, 1900.

W. L. CLELAND, M.B. (President) in the chair.

EXHIBITS.—MR. GITTINS showed the fruit of a Japanese climbing plant which Mr. J. G. O. Tepper subsequently discovered was that of Akebia quinata, belonging to the order Berberideæ, and a native of China and Japan. MR. TEPPER exhibited some galls from the wattle, Acacia pycnantha, describing the insect which produced them. He also showed a case of mosquitoes, Anopheles, which had been collected by order of the Government to forward to London for the School of Tropical Medicine to examine malarial germs, &c., and made some interesting remarks on this troublesome insect.

PAPERS.—"A Collection of Birds' Skins from Kalgoorlie, W.A.," by ROBERT HALL. "Further Notes on Australian Coleoptera, &c.," by REV. THOMAS BLACKBURN, B.A.

ORDINARY MEETING, MAY 1, 1900.

W. L. CLELAND, M.B. (President) in the chair.

EXHIBITS.—PRESIDENT, referring to minutes of last meeting, stated that it had been noticed that in two districts, widely separated—one in Africa, the other in Indo-China—mosquitoes did not exist, and malarial fever was there unknown. W. HOWCHIN, F.G.S., exhibited graphic granite and felspar from Winulta Creek, and from near Corny Point, Yorke Peninsula, and showed some felspar which the natives had endeavoured to shape for their weapons, but had found very difficult to point owing to the cleavage and hackly fracture of it. He also exhibited specimens of the matrix in which diamonds were found from the De Beer's mine, South Africa. A. ZEITZ, F.L.S., Assistant Director of the Museum, exhibited 20 species of abnormally coloured birds collected in South Australia. J. G. O. TEPPER, F.L.S., exhibited a piece of wattle tree stem completely riddled by the larvæ of (*Agrilus Australasiæ*) beetles which are so destructive in wattle plantations. Also a rare fungus, *Battarrea* sp.? forwarded from Dalkey by MISS WARE.

PAPER.—"A Tentative Hypothesis of the Nature of Heat as a Form of Energy," by J. G. O. TEPPER, F.L.S.

ORDINARY MEETING, JUNE 5, 1900.

W. L. CLELAND, M.B. (President) in the chair.

PROFESSOR RALPH TATE moved, MR. HOWCHIN seconded—"That the congratulations of this Society be accorded to Joseph Vardon, one of the oldest Fellows of the Society, upon his election as member of the Legislative Council for the Central District of the colony."—Carried by acclamation.

EXHIBITS.—J. G. O. TEPPER, F.L.S., a piece of leather made from hide destroyed by Queensland tick. E. ASHBY, several moths collected by himself; one of which was identified by Mr. Tepper as *Lithosia*. W. HOWCHIN, F.G.S., in connection with his paper on glacial action in Southern Yorke Peninsula, specimens of ice-marked stones. One was an ice-polished granite boulder from a well at Yorktown found in clay 60 ft. down.

PAPERS.—"Evidences of Extinct Glacial Action on Southern Yorke Peninsula," by WALTER HOWCHIN, F.G.S. "Supplementary List of Plants from Mount Lyndhurst Run," by MAX KOCH.

ORDINARY MEETING, JULY 3, 1900.

W. L. CLELAND, M.B. (President) in the chair.

PAPER.—"The Physical Features of Lake Callabonna, with an Account of the Discovery of its Fossil Remains," by PROFESSOR E. C. STIRLING, M.D., F.R.S. (Published in "Memoirs," vol. I., part 2).

ORDINARY MEETING, SEPTEMBER 4, 1900.

W. L. CLELAND, M.B. (President) in the chair.

EXHIBITS.—A. ZEITZ, F.L.S., C.M.Z.S., exhibited two species of crustaceans, *Limnosia* sp.? and *Chelura* sp.? which he discovered boring in the piles of Largs Bay Jetty and destroying the outer surface, whilst the *Teredo* riddles the interior. J. G. O. TEPPER F.L.S., showed a lime fruit affected by a new disease not described by McAlpine in his "Diseases of Citrus Trees." W. H. SELWAY showed some rare wild flowers gathered from the foot of hills some two miles west of Golden Grove; also an orchid Caladenia? from Monarto.

PAPERS.—(1) "On the Discovery of Fossiliferous Rocks in High Southern Latitudes." (2) "Section of a Well Bore near Wellington," by PROF. RALPH TATE, F.G.S.

"The Complete Theory of Changing the order of Integration in a Multiple Integral (part 1)", by RICHARD KLEEMAN. (Withdrawn.)

"Definitions of two new Species of South Australian Polyplacophoræ," by EDWIN ASHBY.

"Definition of a new Species of South Australian Polyplacophora," by M. M. MAUGHAN.

ANNUAL MEETING, OCTOBER 2, 1900.

W. L. CLELAND, M.B. (President) in the chair.

EXHIBITS.—W. L. CLELAND, M.B., exhibited photographs of aborigines from various parts of Australia with a view of illustrating their uniformity of type.

ANNUAL REPORT AND BALANCE-SHEET were read and adopted.

ELECTION OF COUNCIL.—President, Prof. Edward H. Rennie, M.A., D.Sc., Lond.; Vice-Presidents, Walter Howchin, F.G.S., W. L. Cleland, M.B.; Honorary Treasurer, Walter Rutt, C.E.; Honorary Secretary, G. G. Mayo, C.E.; Members of Council, Rev. Thomas Blackburn, B.A., Prof. Ralph Tate, F.G.S., Samuel Dixon, W. H. Selway, E. Ashby, and A. M. Morgan, M.B., Ch.B.; Auditor, J. S. Lloyd.

PAPERS.—"New Australian Mollusca," by PROF. RALPH TATE, F.G.S., and W. L. May. "Further Descriptions of Australian Coleoptera," by REV. THOMAS BLACKBURN, B.A.

The newly-elected President, Prof. E. H. Rennie, then took the chair, and the Presidential Address, "Factors Producing Uniformity of Type amongst Australian Aborigines," was read by the retiring President, W. L. Cleland, M.B.

REV. THOMAS BLACKBURN moved, MR. A. ZEITZ seconded—"That the above address be printed in the Society's Transactions."—Carried.

ANNUAL REPORT.

The Council has to report that during the past year an effort has been made to create a greater interest in independent research, as promoted by this Society, by encouraging science students of the University and the School of Mines to attend the ordinary monthly meetings, and also by giving more publicity to them by advertising in the daily press. These efforts have not been without success, but the membership remains almost stationary.

The membership of the Society consists of 11 Hon. Fellows, 68 Fellows, and 6 Corresponding Members.

The second part of the "Memoirs," vol. I., dealing with the Fossil Remains of *Genyornis newtoni*, from Lake Callabonna, the joint production of Prof. E. C. Stirling, M.D., F.R.S., &c., Director, and A. H. C. Zietz, F.L.S., C.M.Z.S., Assistant-Director, of the Adelaide Museum; and the Physical Features of the Lake, by the first-named scientist, has been issued. There seems to be some outside interest in this work already, and, doubtless, when it becomes better known it will find a very prominent place amongst the scientific public. Mr. Walter Howchin, F.G.S., has extended his researches on Past Glacial Action in Southern Yorke Peninsula, where he has made some interesting and valuable discoveries; while Prof. Ralph Tate, F.G.S., has brought under the notice of this Society the unique discovery of fossil remains in high Southern latitudes.

A card catalogue of the Society's books and scientific serial literature is now being prepared, which it is hoped will at once make these valuable works more accessible to the Fellows and Members.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£ s. d.	£ s. d.
Oct. 1, 1899.		
To Balance		105 6 0
" Subscriptions—		
Royal Society	60 7 9	
Field Naturalists' Section ...	17 0 0	
Astronomical Section	18 12 6	
	—— ——	96 0 3
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Ordinary	76 13 0	
Illustrating Fossil Fauna of S. Australia	100 0 0	
	—— ——	176 13 0
" Interest		4 7 9
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Cr.	£ s. d.	£ s. d.
By Cost of Transactions—		
Printing	100 9 0	
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" Cost of Memoirs—		
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" Advertising		0 9 0
" Exchange on Cheques		0 3 0
" Balance in Savings Bank, Oct. 1, 1900		143 2 0
		£382 17 0

Audited and found correct.

EDWIN ASHBY, Auditor.

WALTER RUTT, Treasurer.

Presidential Address.

FACTORS PRODUCING UNIFORMITY OF TYPE AMONGST AUSTRALIAN ABORIGINES.

By W. L. Cleland, M.B.

(Read October 2, 1900.)

In offering a Presidential Address I may congratulate the Society on the production of Part 2 of its "Memoirs" during the year; and also that the Government has again placed on the estimates a further sum of £100 towards the publication of Part 3, descriptive of the Calabonna fossils. It is also pleasing to note that the value of the anthropological work done by Prof. Baldwin Spencer and our fellow colonist, Mr. F. G. Gillen, S.M., has been appreciated by leading scientific men in Great Britain. This has led to a memorial being sent to the South Australian Government and the University of Melbourne, that these two gentlemen might be allowed a further opportunity of studying the aboriginal habits and customs in Central Australia. It is extremely gratifying to know that the authorities have seen their way to granting the request, and that the princely generosity of Mr. David Syme, of the Melbourne *Age*, has supplied the necessary funds.

It may be of interest to the Fellows of the Society if a short space is devoted to the consideration of how there exists such a uniformity of type in the appearance of the aborigines of Australia. To enquire why, considering the Continental dimensions of Australia, practically the same type of features appears in parts separated by hundreds of miles. To enquire why evolution, which is always at work, has not produced greater diversity of type.

It has been pointed out by Romanes, in his work, "Darwin and After Darwin," that evolution rests on a tripod consisting of Variability, Heredity, and Isolation. And that evolution again is monotypic or polytypic according to certain definite conditions. And, further, that there is no evolution at all if free intercrossing is allowed amongst all the members of the parent stock, and if isolation in any of its many forms is not present. For, although there is a tendency to variability in each individual, yet heredity in the event of free intercrossing neutralises this tendency by the

production of the mean of the whole. Under these conditions heredity tends to uniformity of type if the numbers are large. If, however, the parent stock be separated into parts, which are prevented from interbreeding, or a part of whose progeny becomes less fertile or less adapted to altered conditions, then a new factor, namely, isolation, comes into play, and an evolution or evolutions of type appear as a result. The diversities of these results will depend upon the size of the separated parts. For instance, a parent stock divided into two equal parts by isolation will evolve into two different types because the mean of variability of a-half is different to that of a whole, but the evolution will be slow, because the differences would be slight between the two, other things being equal. If, on the other hand, the separated part is comparatively small, the divergent evolution would be proportionately marked and appear at an earlier date.

To fully appreciate the effects of isolation, considerable emphasis is laid on the species of isolation as distinguished from the form of isolation, the former being much more important as an evolutionary factor. In other words, is the isolation discriminate or indiscriminate; in the discriminate isolation it is a breeding of like with like; in the indiscriminate it is an interbreeding between all the members of a simply separated part. If a breeder divides his flock of sheep into a white part and a black part, it will be a case of discriminate isolation; if simply into numerically two equal parts it will be a case of indiscriminate isolation. Unfortunately, different names have been given to these two kinds of isolation, although practically the same thing is understood. For instance, discriminate isolation is called by Gulich segregate breeding, by Weissman amixia, and by Romanes homogamy; whilst indiscriminate isolation is called by Gulich separate breeding, by Weissmann panmixia, and by Romanes apogamy. To clearly define what he implies by the use of different terms applied to isolation, Romanes makes the following note:—Let isolation be considered a *generic* term; *species* of isolation will be homogamy and apogamy or isolation as discriminate and indiscriminate, and that natural selection may be considered a *sub-species* of homogamy; *forms* of isolation are modes of isolation, such as the geographical, the sexual, the instinctive, or any other of the numerous means by which isolation of either species may be secured; *cases* of isolation are the instances in which any of the forms of isolation may be at work; thus, if a group of intergenerants be segregated into five groups, *a*, *b*, *c*, *d*, *e*, then before the

segregation there would have been one case of isolation, but after the segregation there would be five such cases.

Variability.—The most important and fundamental cause of evolution must necessarily be the innate tendency of all organisms to vary one from the other, for a close inspection reveals the fact that no two are exactly alike. It is found again that in different species the range of individual variability varies to a considerable extent; that is, that some species are more stable than others. So that conditions that would cause some collections of individuals to evolve in certain directions may be quite inoperative when applied to others. Romanes quotes as an example of the latter, the goose, which Darwin calls an "inflexible type" as compared with most other domesticated birds. He also refers to some extremely striking examples quoted by Weissmann for the sake of showing that there are cases which seem to tell against the general principle of modification as due to apogamy alone. These examples are four species of butterflies, belonging to three genera, which are identical in the polar regions and in the Alps, notwithstanding that these insects have been presumably separated from the parent stocks since the glacial period; and another example refers to a fresh water crustacean (*apus*), the represenatives of which are habitually compelled to form small isolated colonies in widely separated ponds, and, nevertheless, exhibit no divergence of character, although isolation has probably lasted for centuries. Again, on Mount Kosciusko were found specimens of flora and fauna characteristic of the alpine regions of Tasmania. On the other hand, the land mollusca of Maderia and the Sandwich Islands present diversities of types as numerous almost as the different sites suitable for local isolation. It is evident, therefore, that the existence of this tendency or otherwise to individual variability must play a most important determining influence on evolution. In the human species, where the type is pure, the tendency to variability appears to be small, as may be conveniently seen in the Jewish, Negro, and Fellaheen types. In the case of the Australian aboriginal, whether he is autochthonous or an emigrant, he must have been isolated for a lengthened period from other races of man due to his geographical position. His type is found nowhere else, and he has shown but little tendency to vary that type, so that the presumption is on the side of an autochthonous origin. The absence of a tendency to variability must, therefore, have been an important factor in producing uniformity of type amongst the Australian aborigines.

HEREDITY.—Variability would not be of much use in evolution where it not that physical characteristics can be transmitted from parent to offspring. A tendency to variability will exist in all organisms, although the amount of that tendency will vary within very large limits. Heredity may be either a help or a hindrance to evolution, as has been plainly shown by Romanes. In the case of the Australian aborigines, which has it been? According to the "Law" of Delboeuf, quoted by Romanes, a constant cause of variation, however insignificant it may be, changes the uniformity of type little by little, and diversifies it *ad infinitum*. From the homogeneous, left to itself, only the homogeneous can proceed; but if there be a slight disturbance in the homogeneous, the homogeneity will be invaded at a single point, differentiation will penetrate the whole, and, after a time—it may be an infinite time—the differentiation will have disintegrated it altogether. Has this differentiation which existed amongst Australian aborigines been accentuated or diffused by heredity? Prof. Pearson and his colleagues, writing on "Genetic (Reproductive) Selection" in the *Philosophical Transactions* of the Royal Society of London, vol. 192, in their concluding remarks, make the following statement:—There is, so to speak, in every species an innate tendency to progressive change, quantitatively measureable by determining the correlation co-efficients between fertility and organic characteristics and between fertility in the parents and the offspring. This "innate tendency" is no mysterious force causing evolution to take place in a pre-ordained direction, it is simply a part of the physical organization of the individual which does not leave fertility independent of physique and organic relationship, or leave these characters uncontrolled by the principle of heredity. The suspension of natural selection does not denote either the regression of a race to past types, as the supporters of panmixia suggest, or the permanence of the existing type as others have believed. It really denotes full play to genetic or reproductive selection, which will progressively develop the race in a manner which can be quantitatively predicted when once we know the numerical constants which define the characters of a race and their relation to racial fertility. In other words, natural selection must not be looked upon as moulding an otherwise permanent or stable type; it is occupied with checking, guiding, and otherwise controlling a progressive tendency to change.

Heredity, in the presence of free intercrossing, cancels the tendency to variability, causing fixity of type. A considera-

tion of the marriage laws as described in *Native Tribes of Central Australia*, plainly shows that elaborate precautions, no doubt quite unconsciously, are taken to ensure free intercrossing. Referring to various sexual relations, as occurring at corroborees and other tribal ceremonies, the authors express the opinion that the most feasible explanation is that at one time "promiscuity" was the general and universal rule as regards marital relationships. Amongst gregarious animals "promiscuity" must theoretically be the rule, although in practice one or more of the stronger males will usurp to themselves all the females of the group. Promiscuity in itself is detrimental to the fertilising of the ova of higher developed animals, and, if rigorously carried out, would lead to the extinction of the species. Hence is seen the utility of the emotion of jealousy, which finds its fullest expression in man, and acts beneficially as a selective and restrictive influence. In animals it may also be noted, but in a comparatively primitive form, and the remark of the above authors that it is but little developed and scarcely known amongst the Australian aborigines, throws an interesting sidelight on the primordial character of their mental constitution. Promiscuity being then inimical to the propagation of the species, and the application of the principle "that he takes who can" not finding favor with the cunning old men in the presence of the strong young men, it is found that the former gradually evolved what appears at first sight to be a most elaborate system of marital relationships, any infringement of which is punishable by death. Although the term "free intercrossing" seems inappropriate to such a rigid and exclusive system of marriage relationships, yet an examination of these reveals the fact that they in a most effectual manner ensure all the effects of free intercrossing without the evils of promiscuity. For this purpose the native tribes are each divided into what become eight intermarrying groups, the system being more elaborately differentiated in some than in others. In the first place, four groups were arranged, and these were subsequently subdivided. If these first four are looked upon as a first generation, and the subsequent four as a second generation, the following arrangement of letters will show the relationship of the third generation. It may be mentioned that there are no terms amongst the natives expressive of blood relations as distinguished from group relations. For instance, if a man A marries a woman B, the child will not only call A and B father and mother, but all the A's and B's whom the tribal customs would have allowed to be his father and mother had they been mated.

	Intergenerant Groups.		Offspring Groups.	
1st generation ...	$a + b$ produces		g or f	2nd generation.
	$c + d$	"	e " h	
2nd generation ...	$e + f$	"	c " b	3rd generation.
	$g + h$	"	a " d	
3rd generation ...	$a + b$	"	g " f	4th generation.
	$c + d$	"	e " h	

The significance of the word "or" in the above table is that different group-names are given to the children according as to whether "a" &c., &c., is male or female. The above scheme of marital arrangements shows that the progeny of the four first groups (a, b, c, d), have to cross-marry in the second generation according to the four second groups (e, f, g, h). Their progeny again cross-marry in the third generation, and are called by the same group names as the original four first groups. This complete and systematic intercrossing for three generations causes the principle of heredity to swamp any tendency to divergent or polytypic evolution. Whatever tendency there may have existed to variability would under these conditions have been all in one direction, and have been the mean of the whole, producing a monotypic evolution, because, as Romanes points out, natural selection alone can never produce polytypic, but only monotypic evolution. The marriage laws of the Australian aborigines are seen, therefore, to favor the maintenance of a uniformity of type.

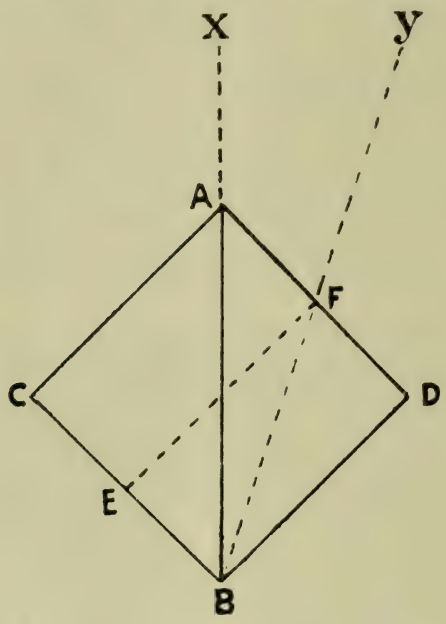
Isolation.—As has been mentioned, isolation is a generic term having species, sub-species, forms, and cases. As a *genus* the isolation of the Australian aboriginal has been a marked one, and, comparatively speaking, a complete one, from the rest of humanity. As a *species* of isolation it may be put under the heading of homogamous or discriminate isolation; that is, the breeding of like with like. There is no evidence of this race having been separated from any parent stock, nor do there exist any traditions pointing to any such past, but everything seems to confirm the idea that they are part and parcel of their environment, or, in other words, autochthonous. The isolation, therefore, has been essentially discriminate. It has been pointed out that that *sub-species* of homogamy called *natural selection*, which is the exclusive breeding between those best adapted to their environment, is ineffective to produce divergence of type unassisted, except in one direction, but that its effects may be cumulative; or, as Pearson writes, it may be occupied with checking, guiding, and otherwise controlling a progressive

tendency to change. Although it is not necessarily maintained that the Australian aboriginal has not changed at all since his first appearance upon the earth, yet the presumption is that if he has changed, he has changed *en bloc*, and very slowly. As to *forms* of isolation, naturally one of the most important is geographical isolation. Australia, as an ethnological province, appears to have been always secluded to a great extent from the rest of the world, so that facilities for the intermingling of other races were but small. In addition to this, Australia, over a very large area, presents a uniformity of physical conditions of an extent scarcely surpassed in any other portion of the earth. Prof. Tate, in a paper read before the Australian Assoc. Advance. of Science in 1888, on the *Influence of Physiographic Changes in the Distribution of Life in Australia*, shows how climatic differences in geological times have profoundly affected the flora and fauna of respective portions of Australia. A rain-map attached to his paper shows that a scanty rainfall of less than 10 inches per annum has been the usual average for about half the continent, and less than 20 inches for another quarter of it, leaving only a well-watered fringe chiefly confined to the eastern and extreme northern sides. The change in climate has, then, affected Australia as a whole rather than as a part, and there have not been left any isolated regions where a different environment of sufficient intensity might by a process of natural selection have led to the divergent evolution of a portion of the Australian aborigines. There exist also no physical barriers to a free intercourse between the various separated portions of the tribes, so that in Australia itself there was no isolation of a geographical form to foster any tendencies to variability of type. Another form of isolation of considerable importance is sexual isolation. This is also called by Romanes physiological isolation. By it is meant a degree of intertility between groups of intergenerants which leads to the extinction of the offspring. This is what occurs in natural selection, whereby there is only a survival of the fittest, the less fittest to the environment or changed conditions disappearing from the scene. Romanes points out that such natural selection cannot conduce to diversity of type, for it is only the fittest type that survives, and the unfit become isolated from the other by a process of extinction. So that, if natural selection has been at work amongst the aborigines to fit them for the various physiographic changes that have occurred from time to time, its effects have all been in the direction of monotypic variation. Another kind of sexual isolation is a certain degree of infertility, which may exist even between different

varieties of the same species, and much more so between different species. If it were not so, varieties and species would after a time become indistinguishably blended so as to lose their specific characters. This infertility in crossing varies greatly in different races. The English are said to be less fertile in crossing with the Negro than are the French and the Spanish, and also with certain aboriginal inhabitants of America. It cannot be said that there is any appreciable element of aboriginal half-breeds in any part of Australia, nor have the Malays left any special impress on the shores of the Northern parts. It is stated that there are some evidences of a superior race having left an impress on a portion of the Australian aborigines, probably towards the eastern littoral portions of Australia, a part that, according to Prof. Tate in his above quoted paper, since the Pluvial Epoch, has gained accessions to its flora from the Indo-Malay province.

The above observations respecting a few of the conditions of life and customs of the Australian aborigines seem to show that these have not been favorable to evolution towards divergent types. For it must be remembered that, although a collection of organisms has not shown any evolutionary progress, it does not at all follow that it was because it had no evolutionary power. Such a condition may be considered as non-existent in biology. Where no progress exists it is because the forces at work are mutually antagonistic, and thus bring about a condition of equilibrium. It is as true in biology as in physics that a body set in motion by a force will continue in motion until stopped by a force equal to that which set it in motion. The tendency to individual variability which is always existent is the initial propelling power in organic Nature, and isolation and heredity are the extraneous forces which may, according to circumstances, accelerate, retard, or bring to a condition of rest the body affected. The direction of evolutionary progress will also be the resultant of the respective strengths of these two latter forces, whilst the rapidity or momentum of the changes will depend on the power of the initial force; that is, the tendency to variability. The familiar diagram of the parrallelogram of forces will make clear what is meant. Let A be a body of intergenerants set in motion by a force BA (variability) in the direction of X (evolution). If two other forces CA (isolation) and DA (heredity) of equal influence act on the body A, there will be no disturbing element as to direction, but they may have an accelerating or a retarding effect on motion according as to whether their line of action is the same as, or

opposed to, that of BA (variability). If, however, one of the forces CA (isolation) is stronger than DA (heredity), and is represented by the line EF, then the evolutionary direction of the body will be towards Y (divergent evolution).



And whilst referring to the uniformity of type amongst Australian aborigines, it is not to be inferred that there are not a number of individual variations in personal appearance, for Baldwin Spencer and Gillen remark that, whilst conforming generally to the usual Australian type of features, there is very considerable difference between various individuals. In some the pronounced curve of the nose gave superficially a certain Jewish aspect, though in many this curve was wanting. It would, therefore, be quite possible by a process of discriminate isolation; that is, a breeding of like with like, or those having characteristic resemblances, to cause a divergent evolution from the common type. As the authors quoted show, the tendency to variability is there, and it is maintained that that is the initial motive power.

With these few remarks I must draw this address to a close by suggesting that an interesting investigation might

be made respecting the proneness or not of the Australian aborigines to vary individually as compared with more mixed or less purely bred races. Prof. Pearson and his colleagues in the *Philosophical Transactions* of the Royal Society, London, have, during the past few years, published *Contributions to the Mathematical Theory of Evolution*, showing how variation may be exhibited by mathematical formulæ and curves, such curves arising in many physical, economic, and biological investigations, as, for instance, various types of anthropological measurements. They say, "if measurements be made of the part or organ in several hundred or thousand specimens of the same type or family, and a curve be constructed of which the abscissa x represents the size of the organ, and the ordinate y the number of specimens falling within a definite small range, $d\ x$ of organ, this curve may be termed a frequency curve. The centre or origin for measurement of the organ may be taken as the mean of all the specimens measured. In most cases, as in the case of errors of observation, they have a fairly definite symmetrical shape, and one that approaches with a close degree of approximation to the well known error or probability-curve. A frequency-curve, which for practical purposes can be represented by the error-curve, will be termed a normal-curve. When a series of measurements give rise to a normal-curve, we may probably assume something approaching a stable condition; there is production and destruction impartially round the mean. In the case of certain biological, sociological, and economic measurements there is, however, a well-marked deviation from the normal shape, and it becomes important to determine the direction and amount of such deviation." The more data and the greater the number of individual observations there are, the more correct would be any such comparative measurements, and we may confidently expect that the projected extended anthropological investigations of Prof. Spencer and Mr. Gillen will add greatly to the already accumulated store. The presumption is that such an enquiry would show that the curve would approach more nearly a normal-curve in so pure a type as the Australian aborigines than in the more mixed European races.

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LIST OF FELLOWS, MEMBERS, &c.

DECEMBER, 1900.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Date of Election.

HONORARY FELLOWS.

1893. *COSSMANN, M., Rue de Maubeuge, 95, Paris.
1897. *DAVID, T. W. EDGEWORTH, B.A., F.G.S., Professor of Geology, Sydney University.
1888. *DENNANT, JOHN, F.G.S., F.C.S., Inspector of Schools, Stanhope Grove, Camberwell, Melbourne, Victoria.
1876. ELLERY, R. L. J., F.R.S., F.R.A.S., Government Astronomer, The Observatory, Melbourne, Victoria.
1890. *ETHERIDGE, ROBERT, Director of the Australian Museum of New South Wales, Sydney.
1893. GREGORIO, MARQUIS DE, Palermo, Sicily.
1855. HULL, H. M., Hobart, Tasmania.
1892. *MAIDEN, J. H., F.L.S., F.C.S., Director Botanic Gardens, Sydney, New South Wales.
1899. *MEYRICK, E. T., B.A., Ramsbury, Hungerford, Wiltshire, England.
1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Government Astronomer, Sydney, New South Wales.
1894. *WILSON, J. T., M.D., Professor of Anatomy, Sydney University.

CORRESPONDING MEMBERS.

1881. BAILEY, F. M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1887. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, South Australia.
1880. *FOELSCHE, PAUL, Inspector of Police, Palmerston, Northern Territory, Australia.
1886. NICOLAY, REV. C. G., Fremantle, Western Australia.
1883. *STIRLING, JAMES, Government Geologist, Victoria.
1893. *STRETTON, W. G., Palmerston, Northern Territory.

FELLOWS.

1887. ADCOCK, D. J., Adelaide, South Australia.
1874. ANGAS, HON. J. H., Adelaide, South Australia.
1895. *ASHBY, EDWIN, Adelaide, South Australia.
1887. BAGOT, JOHN, Adelaide, South Australia.
1893. *BEDNALL, W. T., Adelaide, South Australia.
1887. *BLACKBURN, REV. THOMAS, B.A., Woodville, South Australia.
1886. *BRAGG, W. H., M.A., Professor of Mathematics, University of Adelaide.

1883. *Brown, H. Y. L., F.G.S., Government Geologist, South Australia.
1882. Browne, L. G., Adelaide, South Australia.
1899. Browne, T. L., Adelaide.
1898. *Browne, J. Harris, North Adelaide.
1893. Brummitt, Robert, M.R.C.S., Kooringa, South Australia.
1879. *Cleland, W. L., M.B., Ch.M., J.P., Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer on Materia Medica, University of Adelaide, Parkside, South Australia.
1895. Cleland, John B., M.B., Ch.B. Syd., Parkside, South Australia.
1876. (L) Cooke, E., Commissioner of Audit, Adelaide, South Australia.
1895. Cooke, John H., Adelaide, South Australia.
1887. *Dixon, Samuel, Adelaide, South Australia.
1896. Drummond, J. H. G., M.D., Moonta.
1893. Dudley, Uriah, White Rock, S.M., Drake, New South Wales.
1890. *East, J. J., F.G.S., 3, Parade, Norwood.
1899. Ferguson, Andrew, Agricultural School, Adelaide.
1886. Fleming, David, Adelaide, South Australia.
1882. Fowler, William, Melton, Yorke Peninsula, South Australia.
1889. Fraser, J. C., Adelaide, South Australia.
1880. *Goyder, George, F.C.S., Government Analyst, South Australia.
1887. Grasby, W. C., F.L.S., Adelaide, South Australia.
1896. Greenway, Thomas J., East Adelaide.
1896. Hawker, E. W., F.G.S., Metallurgist and Assayer, Adelaide.
1899. *Higgin, A. J., Assistant Lecturer Chemistry, University, Adelaide.
1891. *Holtze, Maurice, F.L.S., Director Botanic Gardens, Adelaide, South Australia.
1883. *Howchin, Walter, F.G.S., Goodwood East, South Australia.
1899. Hughes, Samuel, B.Sc., Registrar of the School of Mines, Adelaide.
1893. James, Thomas, M.R.C.S., Moonta, South Australia.
1900. Johncock, C. F., Wilmington.
1853. (F) Kay, Robert, General Director and Secretary South Australian Public Library, Museum, &c., Adelaide.
1899. Kleeman, Richard, Rowlands Flat.
1899. *Koch, Max, Adelaide.
1884. Lendon, A. A., M.D., Lond., M.R.C.S., Lecturer on Forensic Medicine, and on Chemical Medicine University of Adelaide, Honorary Physician Children's Hospital, North Adelaide, Adelaide, South Australia.
1856. Lloyd, J. S., Adelaide, South Australia.
1897. *Lea, A. M., Government Entomologist, Hobart, Tasmania.
1888. *Lower, O. B., F. Ent. S., Broken Hill, N.S. Wales.
1874. Mayo, G. G., C.E., Adelaide, South Australia.
1888. Molineux, A., F.L.S., Secretary Central Agricultural Bureau, Kent Town, South Australia.
1897. *Morgan, A. M., M.B., Ch.B., Angas-street, Adelaide.
1884. Munton, H. S., Brighton, South Australia.
1859. (L) Murray, Hon. David, Adelaide, South Australia.
1896. *Parker, Thomas, C.E., Rockhampton, Queensland.

1883. Phillips, W. H., Adelaide, South Australia.
1886. Poole, W. B., Adelaide, South Australia.
1892. *Priestley, P. H., Unley-road, Parkside.
1885. *Rennie, Edward H., M.A., D.Sc., London, F.C.S., Professor of Chemistry University of Adelaide.
1876. *Rutt, Walter, C.E., Adelaide, South Australia.
1891. Selway, W. H., Adelaide, South Australia.
1893. Simson, Augustus, Launceston, Tasmania.
1857. Smeaton, Thomas D., Blakiston, Littlehampton, South Australia.
1900. Smeaton, Stirling, B.A., Adelaide.
1871. Smith, Robert Barr, Adelaide, South Australia.
1887. *Stirling, Edward C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Professor of Physiology University of Adelaide, Honorary Director South Australian Museum, Adelaide, South Australia.
1876. *Tate, Ralph, F.G.S., Professor of Natural Science University of Adelaide.
1886. *Tepper, J. G. O., F.L.S., Entomologist South Australian Museum, Adelaide, South Australia.
1897. *Torr, W. G., LL.D., M.A., B.C.L., Way College.
1894. *Turner, A. Jefferis, M.D., Brisbane.
1889. Vardon, Hon. Joseph, M.L.C., J.P., Adelaide, South Australia.
1878. *Verco, Joseph C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics University of Adelaide, Adelaide, South Australia.
1883. Wainwright, E. H., B.Sc., St. Peter's College, South Australia.
1878. Ware, W. L., J.P., Adelaide, South Australia.
1859. Way, Rt. Hon. Sir Samuel, Bart., D.C.L., Chief Justice and Lieutenant-Governor South Australia, Adelaide, South Australia.
1886. *Zietz A., F.L.S., C.M.Z.S., Assistant Director South Australian Museum, Adelaide, South Australia.

APPENDICES.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

SEVENTEENTH ANNUAL REPORT OF THE COMMITTEE.

BEING FOR THE YEAR ENDING SEPTEMBER 30TH, 1900.

Evening Meetings.—Nine evening meetings have been held, of which the following is a list:—

1899.

Oct. 17—"The Fertilization of Flowers," Mr. S. Smeaton, B.A.

Nov. 21—Reports of Excursion to Port Victor. Various members.

1900.

March 20—Particulars of Science Congress held at Melbourne in January, 1900. Messrs. M. S. Clark and S. Smeaton, B.A.

April 24—Results of Easter Encampment of Boys' Field Club, Port Noarlunga. Mr. E. Ashby.

May 15—"How Plants Live and Grow," Mr. J. G. O. Tepper, F.L.S.

June 19—"Seeds and their Distribution," Mr. S. Smeaton, B.A.

July 17—"The Structure of Shell Fish," Mr. R. J. M. Clucas.

Aug. 21—"The Leaves of Plants," Miss E. F. Haycraft, B.Sc.

Sept. 18—Annual Meeting, Chairman's Address, "Australian Birds," Mr. E. Ashby.

The attendance at these meetings has been well sustained, being greater than the usual average, and almost as high as for any year during the last decade. A special feature has been a course of papers on Structural Botany. In addition to the seeds and leaves of plants, the chemistry of their growth and the question of fertilization have been dealt with.

Other points are to be touched upon in subsequent addresses.

As a change from botany, one paper treateed of the structure of Mollusca, and at the Annual Meeting the Chairman took up the subject of birds, which has not occupied much attention with us since the inception of the Ornithological Association. Exhibits have, as usual, covered a wide range in Natural History, and have formed an interesting feature of these meetings.

Excursions.—Twelve excursions have been held during the year as under:—

1899.

Oct. 7—Happy Valley.
Oct. 21—Agricultural College.
Nov. 11-13—Port Victor, &c. (three days).
Dec. 9—Glen Stuart (Morialta Waterfalls), via Norton's Summit.

1900.

March 17—Dredging, Port River.
May 19—Grange and Semaphore Beach.
June 16—Brighton.
" 23—"Rostrevor," Magill.
July 26—Black Hill.
Aug. 18—Stonyfell.
Sept. 3—Golden Grove (whole day).
" 22—National Park (Waterfall Gully portion).

These excursions have covered a wide area, and have given opportunity for the study of most branches of Natural History, Geology, Botany, Zoology (both land and marine), Conchology, and Entomology having been included in the scope of the investigations. The most conspicuous feature of these excursions was a three days' visit to Port Victor and neighbourhood in November, 1899, when about 30 members and friends spent a pleasant and profitable time at that favourite seaside resort.

Several kinds of plants not to be seen in the hills near Adelaide were then gathered, while 53 species of birds were identified, and chitons and other marine specimens obtained. An attempt was made to find Selwyn's historic Rock in the Inman River, but its identity could not be clearly established, although the outcrop recorded in its vicinity was found. It was supposed that the rock in question has been covered up since its re-discovery by Professor T. W. E. David and Mr. W. Howchin, F.G.S., in 1897. The excursion to the foot hills west of Golden Grove introduced a new locality for these outings, and brought a somewhat distinct character of vegetation under

notice. Successful results were obtained from the excursions to Happy Valley and Black Hill, whilst fresh ground was traversed at some of the more familiar destinations. A visit to the Agricultural College at Roseworthy, and to the Estate of "Rostrevor," Magill, lent pleasing variety to the ordinary expeditions of the Section. A dredging trip was held, as usual, during the year. At some of the excursions the Boys' Field Club joined forces with the Section, and these combined outings were, it is hoped, mutually profitable.

The attendance at the excursions shows continued interest in this part of the Section's operations, and at the last outing there were more than 30 members and friends present.

Fauna and Flora Protection Committee.—A separate report is presented from this Committee, and shows that the question of Legislation for the Protection of Birds is still receiving earnest attention.

Melbourne Science Congress.—Several members of the Section attended the meetings of the Australasian Association for the Advancement of Science held at Melbourne in January, 1900. Some of the important papers then read, and of the excursion then arranged were subsequently brought under the notice of the members of this Section at the evening meetings.

Proposed 19th Century Festival of Literature, Science, and Art.—Representatives of this Section were appointed on the Committee for this proposed celebration, but after several meetings had been held it was decided to abandon the scheme. In anticipation of this gathering being held, no conversazione was arranged for last year in connection with the Section.

Proceedings.—Beyond the report issued with the Royal Society's Transactions, no printed account of last year's proceedings has yet been published, but it is hoped ere long to combine that and the present year's report in one volume.

Library.—During the year it was decided to establish a lending library in connection with the Section, the nucleus having been presented by Mr. T. D. Smeaton, and members have been asked to donate suitable works for the Library. Your Committee would take this opportunity of again reminding members that they have access, so far as reference is concerned, to the Royal Society's Library, which, it may be mentioned, is now being catalogued.

Membership.—There has not been so large an acquisition of new members during the year as might be wished. Your Committee hope that members will endeavour to induce their friends to join the Section, and so help to counter-

balance the loss that is always to be expected. The number now on the roll is 90.

Financial.—The receipts from subscriptions (£17) have considerably exceeded the disbursements (£8/9). Only £10 has been received in the way of grant from the Royal Society.

EDWIN ASHBY, Chairman.
W. H. SELWAY, Hon. Sec.

Adelaide, Sept. 17, 1900.

TWELFTH ANNUAL REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE OF THE FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA TO BE PRESENTED AT THE ANNUAL MEETING, 18TH SEPTEMBER, 1900.

The Committee have met at intervals in the past year.

Regarding the Forest Reserves, the Committee received, in October last, a letter from the Commissioner of Crown Lands informing them "that all land recommended by the Conservator of Forests to be retained for forest culture is so retained, and wherever suitable land is available it will be set apart for the purpose." Information was however, recently received from Wirrabara that a perpetual lease of 277 acres in the forest had been granted to one man, and at the request of the Secretary, Mr. John Darling, M.P., asked in Parliament some questions of the Commissioner on the subject, receiving the reply that all Forest Reserves were preserved that were worth preserving.

The Birds' Protection Bill referred to in our last report, having lapsed, has been this year re-introduced by Mr. Playford, but in a different form.

The Committee were disposed to join the Bird Protection Society in asking that the Bill should be withdrawn, as many important provisions contained in their own Bill, upon which this one had been founded, were omitted from it. Two of the members waited upon Mr. Playford with this end in view, but, after discussing the question with him, thought it would be better to allow the Bill to go on, and endeavour later to get introduced some amendments to meet their own views. So little progress has, however, been made that there seems little probability of the Bill being passed this session.

EDWIN ASHBY, Chairman.
M. SYMONDS CLARK, Hon. Secretary.

Adelaide, September 18, 1900.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Receipts and Disbursements for the Year 1899-1900.

Dr. Receipts.	£	s.	d.	Cr. Disbursements.	£	s.	d.
To Balance brought forward	4	3	5	By Printing	3	4	0
" Subscriptions	17	0	0	" Postages and Sundries	4	2	6
" Grant from Royal Society	10	0	0	" Attendance	1	2	6
					8	9	0
				" Subscriptions forwarded to Royal Society ...	17	0	0
				" Balance in hand	5	14	5
	£31	3	5		£31	3	5

Audited and found correct,

J. W. BUSSELL,
J. S. LLOYD, } Auditors.

Adelaide, 17th September, 1900.

W. H. SELWAY,
Hon. Secretary and Treasurer.

ASTRONOMICAL SECTION

OF THE

Royal Society of South Australia.

EIGHTH ANNUAL REPORT.

The Committee have to report that the Section has held six ordinary meetings during the past year, and subjects of interest have been discussed, such as meteors, sun spots, &c. Some of our members kept watch for the Leonid showers in November last. Mr. Russel gave a popular lecture, entitled "An Astronomical Evening," illustrated by lantern views, at the Society's room, to a good attendance. In June the President, Sir Charles Todd, gave an interesting paper on "The Sun and its Eclipses," illustrated by elaborately prepared diagrams, which he repeated (by request) for the benefit of the general public a few weeks later at the Royal Society's Room, at which there was also a large attendance.

The Committee have met six times for business. The Section now has three English magazines, which treat of astronomical subjects, and members can obtain them for perusal on application to Mr. Hurst, office of the Postmaster-General, Adelaide.

The "Astronomical Notes"—published monthly sinec July, 1892, and consequently now in their ninth year—have appeared with consistent regularity during the past year, and, as formerly, have proved of a highly satisfactory nature.

The question box is still open to enquirers.

Adopted at the annual meeting of the Section, held at the Adelaide Observatory on the evening of Tuesday, September 11, 1900.

C. Todd, President.
W. E. Cheesman, Hon. Secretary.

Balance Sheet for Year 1899-1900.

Dr.	£	s.	d.	Cr.	£	s.	d.
To Balance, 1899	29	7	10	By Subscriptions paid to Royal Society	9	2	6
" Subscriptions Received	9	2	6	" Advertisements	0	17	6
" Interest	0	16	7	" Postage	3	2	0
				" Printing " Monthly Notes "	2	4	0
				" Lantern, &c.	1	2	6
				" Caretaker Royal Society's Kooms	0	5	0
				" Rubber Stamps...	0	10	6
				" Magazines	2	12	5
				" Minute Book	0	4	9
				" Stationery and Printing	0	14	6
				" Balance	18	11	3
	£39	6	11		£39	6	11

Read at Annual Meeting held 11th September, 1900, and adopted.

C. TODD, President.

W. E. CHEESMAN, Hon. Sec.

Audited and found correct, 10/9/00.

RICHARD F. GRIFFITHS.

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AND

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Suggestions on the Origin of the Salt Lagoons of Southern Yorke Peninsula.

By Walter Howchin, F.G.S.

[Read December 4, 1900.]

Introductory.

The physical features of the country forming the "foot," or southern portions of Yorke Peninsula, are very singular and interesting. Taking the latitude of Stansbury as a northern limit, the district includes the Hundreds of Dalrymple, Melville, Moorowie, Parawurlie, Coonarie, Carribie, and Warrenben, extending about forty miles by twenty miles, or an area of 800 square miles. Throughout this considerable extent of country there are no rivers or running streams, and, consequently, the drainage of the land finds no outlet to the sea. Under such conditions it follows, as a matter of course, that the inland centres of drainage become the repositories of saline deposits from the concentrated mineral substances in the waters, but there are special features pertaining to the physiography and geology of the country which makes the origin of the lagoons a subject of considerable interest.

The unusual feature of hundreds of saucer-shaped depressions, irregularly scattered over most of the country named, have to be accounted for. The official maps, on a scale of one inch to the mile, record no less than 200 within the district, but the maps do not include a vast number of minor depressions which are frequently met with in travelling through the country, and which may or may not contain saline deposits. In a recent visit to the locality I observed many such areas, which do not rank as lagoons; they receive but little drainage, and the bottom, instead of being a lake, support a saliferous flora. Whatever may have caused these remarkable superficial depressions, it is evident they have had a common origin, and the agency that has produced these results must have operated over a wide extent of country.

The Salt Lagoons not of Marine Origin.

It would be an easy solution of the difficulty if we could explain these scattered saline areas as the remnants of a retreating sea, and some of the phenomena under observation are

not unfavorable to such a supposition to a limited extent. There are, for example, indisputable proofs that since the close of the Tertiary period the land has risen several feet, and this elevatory movement has led to the retreat of the sea from a low-lying belt of country, running north and south, uniting Hardwicke Bay and Sturt Bay. These evidences of recent geological change were noted by Professor Tate in a paper read before this Society in 1890. It must be observed, however, that the physical features of this raised sea bed are distinctly different from the lagoon country which occupies somewhat higher ground. The erstwhile narrow strait which has become dry land is known as the "Great Salt Marsh." Its bed is comparatively level, and, whilst stretches of water occur at intervals along its course, it lacks the features of the circular lagoons on the higher ground, and does not deposit salt to anything like the same extent as many of the lagoons.

The physical features of the Great Salt Marsh are perfectly consistent with those of a raised sea bed, but the circular salt lagoons are not. No form of marine erosion can produce saucer-shaped depressions below the normal level.

Various Origins of Lake Basins.

The origin of lake basins can usually be referred to one or other of three agencies:—

(*a*) *Ice action*, in which a rock basin may be formed by the eroding power of land ice; or, otherwise, morainic material thrown across a line of drainage, may dam back the waters, and thereby form a lake.

(*b*) *Wind* acting on the surface of bared silt or clay may scoop out hollows, the axis of erosion being in the direction of the prevailing strong winds.

(*c*) *Chemical solvents* acting upon rocks, *in situ*, and by removal of material in solution, produce superficial depressions of greater or lesser extent.

[It is not necessary to refer here to such minor causes of lakes as marginal lagoons, impounded by blown sand along some coasts, or crater lakes of extinct volcanoes, as they are local features, and their origin is generally sufficiently manifest.]

Of the three principal agents, mentioned above, which may give rise to lakes, *ice* is out of the question in explaining the lagoon phenomena of Yorke Peninsula, for, whilst the district carries abundant evidences of an extinct ice field, the glaciation was long anterior to the formation of the present surface features, and there is nothing in the physical characteristics of the lakes to suggest either rock basins or

morainic obstructions to drainage. The only alternatives* are to assume the action of either wind erosion or chemical solution, and I am disposed to think that both these agents have played their part in producing the unique physical features of the district.

Geological Features of the District.

In a previous paper† the present writer has described some of the geological characteristics of the country under consideration. The geological formations occur, as shown in the following table:—

Recent.—Blown sands. Dolomitic travertine. Saline deposits.

Post Tertiary.—Calciferous shelly sands (raised sea bed). Natural whiting.

Pliocene or Miocene.—Mottled and variegated clays. (Dry land conditions).

Eocene.—Fossiliferous limestone (marine).

Pre-Tertiary.—Glacial sands, till, and boulders showing ice action.

Archaean.—Metamorphic and granitic.

The highly metamorphic and granitic rocks are visible only at certain points on the coast, and form the prominent head lands. The geology of the *inland* portions of the district is limited to such formations as shown in the table, which overlie the Archaean, and each member of these newer formations bear evidence of extensive waste. Thus, on the west side of Troubridge Hill, on the south coast, and at Point Turton, on the north coast, the Eocene limestones occur between the glacial beds and the Travertine limestone of the district, but at many points on the coast, as well as over the greater part of the inland country, the Eocene is absent, and the recent travertine beds rest directly on the glacial deposits.

That the Eocene beds at one time covered most, if not all, the southern portion of the Peninsula, may be inferred from the number of outliers of this formation, which can be noted scattered over the area.

The following occurrences of the Eocene beds were either directly observed by the writer or given on information received from trustworthy sources:—

---

* The advocates of marine erosion might assume that the lagoons were originally coastal bays that, on the retreat of the sea, became converted into lakes through sand bars being thrown across their outlets. But this is inadmissible; first, because no marine shore banks exist in such situations, and, further, the physical features of the lagoons are entirely opposed to such a theory.

† Trans. Roy. Soc. S. Aus., vol. XXIV. (1900), p. 71.

(*a*) Sea cliffs on eastern coast line both north and south of Stansbury.

(*b*) Small local occurrence in sea cliff west of Troubridge Hill, on south coast.

(*c*) At Corney Point a three feet bed of Eocene limestone, in a very limited lateral extension, rests immediately upon the metamorphic rocks.

(*d*) At Point Turton, in Hardwicke Bay, occurs the most important exposure of these beds in the district.

(*e*) At Brutus Castle, Sec. No. 74, Hund. of Parawurlie, an inland cliff of Eocene can be seen not far from the coast.

(*f*) Hund. of Coonarie, Sec. No. 205, about three miles south-east from Warooka and one mile east of Piesey Trig., a considerable exposure of limestone of this age occupies the slope of the hill near the public road.

(*g*) Inland cliff about four or five miles from coast at Sturt Bay.

(*h*) Another exposure in the same Hundred, in or near Section 75, about one mile from the coast.

(*i*) Hundred of Melville, Sec. No. 254, near seven road ends, between Yorketown and Edithburg.

(*j*) In the same Hundred, a well-sinking in Section No. 265 E., proved the Eocene limestone at a depth of 60 ft. from the surface. In another sinking, on the adjoining section, No. 264, and situated on the other side of the public road, the limestone was also met with at about the same depth.

As the outcrops above mentioned have but a limited local extension, and the limestone is but very rarely met with in sinking wells, it is evident that the Eocene beds in the district must be regarded as widely scattered outliers that are the remnants of what originally was a continuous formation.

Removal of Material by Chemical Solution.

The removal of the Eocene limestone from so large an area is a notable fact, and one that cannot be accounted for on the assumption of sub-ærial erosion, for no such mechanical agent of transportation as running water exists throughout the district to-day, nor is there any indication in the physical contour of the ground, or in the alluvial deposits, that it has operated to any great extent in post Eocene times. All the facts that are available seem to point to chemical *solution* as the probable agent of removal.

That extensive chemical change and reconstruction have been effected over the area in question is apparent from many distinct lines of proof. At Point Turton and elsewhere the

fossiliferous limestone has become more or less altered by solution and redeposition, which in some cases have entirely obliterated the organic features of the rock. Over the country from which the Eocene limestones have disappeared there also occur important secondary deposits which have apparently been formed by the destructive chemical agents operating on the older limestones; these secondary deposits are mainly dolomitic travertine, calcium carbonate, sodium chloride, and gypsum.

Secondary Deposits Resulting from Chemical Solution.

Dolomitic travertine, in varying thickness, is very generally distributed over the district, and in many instances rests directly on the glacial clay. It is improbable that the travertine limestones have been formed by the segregation of carbonate of lime from the glacial beds which underlie them, as the latter seem to be singularly destitute of calcareous matter. The thickness of these beds, in some cases, amount to no less than twenty feet, which demands a very considerable repository of calcium carbonate in the subsoil to produce so thick a travertine crust. It is not improbable that the Eocene limestones have been entirely substituted over a great extent of the country under review, passing by solution and reconstruction into the dolomitic and other equivalents which have formed in close proximity to the original limestone beds.

Much of the calcium carbonate, when in a state of solution, would doubtless be carried some distance from its source by subterranean waters, so that an area that is by this means losing its rock material will naturally exhibit irregularities of surface, including saucer-shaped depressions. In most limestone districts loss of material by solution leads to the formation, not only of subterranean caves, but superficial depressions popularly known as "crab holes," "swallow holes," or "Bay of Biscay country." The existence, therefore, of numerous sunken areas in Southern Yorke Peninsula can be naturally correlated with the disappearance of the Tertiary limestones from much of the lagoon country.

In some parts of the Great Salt Marsh, and along the West Coast, as well as behind Cape Spencer, there is a remarkable deposit of almost pure carbonate of lime, perfectly white, and with the physical features of whiting. It is undoubtedly a secondary depost of calcareous material that has accumulated, not from solution, but from mechanical waste. I was not able to visit the localities where it occurs, but I am informed by residents of the district that it exists in very pure deposits up to seven feet in thickness, or even more. In 1889*

* Trans. Roy. Soc. S. Aus., vol. XIII. (1889-90), p. 113.

Prof. R. Tate drew the attention of the Society to the existence of this interesting formation, and referred its origin to "the accumulation of exfoliated shell substance, washed out of the incoherent shell banks." This seems a plausible explanation of its origin, and, as such, does not fit in to the phenomena with which we are dealing in this paper. The natural whiting forms by a rearrangement of recent shelly material, and not from solution of the older Tertiary limestones as in the case of the travertine deposits.

The chemical action which has led to the disappearance of the Eocene limestones can be easily determined. Practically all the rain that falls in the district is retained in the land or in the subsoil, therefore the whole of the carbon dioxide in solution (H_2CO_3) becomes locally available in setting up the initial chemical change. During the wet months of the year the porous limestones would become saturated with rain water, and a certain portion of the calcium and magnesium carbonates would pass into solution when attacked by the free carbonic acid in the water. The dry months of summer cause a desiccation of the superficial stratum, and the mineral-charged waters are, in consequence, drawn towards the surface, and at a point where evaporation becomes possible the free carbonic acid escapes, leaving a calcareo-magnesian carbonate, or dolomitic limestone, as a crust. If such a process of change is continuous (and it must be so as long as the climatic conditions remain as at present), it is only a question of time when the marine limestones will suffer a complete reconstruction under new chemical combinations. The few scattered outliers of this formation which occur in the district, and their varying thickness, mark the differential degrees in which this work of chemical change is being effected at respective points. It is a slow process, and the amount of material that has been removed is very great, but is not greater than has been achieved by the same acidic solvent in other parts of the world.

In addition to this secondary deposit of dolomitic travertine we have to account for the considerable deposits of sodium chloride and gypsum, which are also characteristic of this country. Common salt, scraped from the beds of the lagoons is exported annually from the district to the extent of 35,000 tons*; and in most of the lakes gypsum forms in the saliferous layer which extends to a few feet from the surface. The more soluble sodium chloride assumes the solid and liquid conditions alternately with the dry and wet sea-

* The export of salt during the ten years, 1890-1899, has risen from 5,598 tons to 35,053 tons.

sons of the year. The existence of the lagoons, as sunken areas, is an advantage of the greatest practical importance under present conditions; indeed, nothing less than the salvation of the country. By their existence the concentration and localization of the saline substances become possible, and by this means the higher lands are drained of their salt, and rendered sweet. A flood in this country is an event greatly to be dreaded. If the waters rise above their normal level and empty themselves into the numerous *cul de sacs* which the configuration of the country supplies, the sweet herbage is killed up to the level of the storm waters, and a new flora, of a salsolaceous type, takes its place. Several examples of this deterioration of the soil, caused by a flood that occurred a few years ago, were pointed out to me in my journey. Good dark soil that had previously grown heavy crops was now bare except for a few plants whose habits of growth fitted them for a saline soil; the white crystals of salt could be easily recognised as glistening particles on the background of the dark soil. In one situation affected in this way a farmer showed me a well that was filled by the waters of the flood—before the inundation the water was comparatively sweet, and was used for farm purposes, but since the flood referred to the water in the well is like brine, and quite useless.

Fine examples of gypsum crystals can usually be obtained by digging in the silt of the lagoons. The gypseous layer commences about a foot from the surface of the lake deposit. Some interesting examples, exhibiting complex twinning are obtained in the Cape Spencer locality, but I had not time to visit the spot. On the southern side of Lake Fowler (the largest of the lagoons), a very remarkable deposit of granular gypsum lines the shores of the lake in a range of hills 80 feet high. The hills consist almost entirely of pure gypsum in the form of small crystals the size of coarse sand. In places the gypsum partakes of the character of a white powder, resembling flour, and the deposit, as a whole, is so pure that it is simply shovelled into sacks and carted away to the mill for commercial purposes. How such a clean deposit could have been formed, and in solid mass, so high above the present level of the lake, are questions not easy to answer.

The association of gypsum and rock salt with dolomitic limestones is so general an occurrence as to suggest community of origin. This subject has been dealt with very fully by Dr. Sterry Hunt in his "Chemical and Geological Essays," and throws considerable light upon our present enquiries. In the Murray districts and elsewhere in South

Australia the lower Tertiary limestones are associated with considerable saline and gypseous ingredients, but the conditions in Yorke Peninsula are much more favorable for the conservation of these minerals, because there is practically no outward drainage for the waters of the district. The distribution of sulphur is very general in the organic, as well as inorganic, world, and, therefore, offers no difficulty in accounting for the presence of gypsum under the conditions named. Sulphate of magnesia is easily soluble, and would react on the calcium carbonate that had passed into solution by excess of carbonic acid, forming the resultants, sulphate of lime and bicarbonate of magnesia; the former crystallising out as selenite, and the latter, uniting with calcium carbonate, forming the dolomitic travertine.

Importance of the Glacial Clay in the Physical Features.

One of the chief determining factors in the physical features of Southern Yorke Peninsula is, undoubtedly, the glacial clay, which, as described in a previous paper, seems to underlie most of the district. At Point Turton, on the north coast, and in the sea cliffs a little west of Troubridge Hill, on the south coast, the Eocene limestone is seen to rest directly on the glacial clay. This formation of compact clay supplies the base—the impervious floor, on which for the most part the newer formations of the district rest. Had no such impervious barrier existed, the superficial drainage would no doubt have found its way to greater depths, and carried the soluble minerals beneath the surface. As it is, at present the chemical reactions have largely taken place above this floor line, and have become intensified by evaporation and concentration carried on through a very prolonged period.

The depth of the lagoon floors below the normal level varies from a few feet up to probably forty feet. At the outer rim of the depression the ground usually has a gentle slope towards the lake, with steep or nearly vertical cliffs near the water's edge. As some of these basin-shaped hollows have been excavated in glacial sands and clay, it is certain that, in some cases, other agents besides chemical solution have been responsible for their excavation in part. It is noticeable that the cliffs surrounding the lagoons are often lower or more sloping on the north-east side than the opposite. As the prevailing winds are from the south-west, it will be seen that in such instances the lower banks are in the windward direction. The beds of the lagoons are for the most part dry for a considerable part of the year, and when in this condition they expose a level surface of fine silt that might easily be carried by the wind. If a crust of salt forms over the mud flats

when the water evaporates, this, of course, counteracts the action of the wind, and conserves the fluviatile material of the lake bed; but it is difficult to imagine how these shallow depressions can be scooped out of sedimentary deposits except by the wind, and as there seems to be evidence that the banks show a tendency to sheer in the windward direction, it lends plausibility to the assumption.

Fauna of the Lagoons.

The existence of foraminiferal shells in the silt of the Yorketown Lagoon was brought under my notice by Mr. Matthews, of Yorketown. I was unable to visit the lagoon in question, but Mr. Matthews kindly placed some of the material in my hand for examination. I found a considerable number of dead shells of *Polystomella striato-punctata*, and *P. macella*. These forms are characteristically estuarine in habitat, and the individuals found in the lagoon were small, starved varieties of the species, giving evidence that their lot has been one of struggle for existence under adverse conditions. With the foraminiferal remains there also occur a few ostracoda and the gastropod, *Coxiella confusa*. The last-named may be regarded as ubiquitous in its distribution over the marginal maritime belt of Southern Australia, under brackish water conditions, as well as in many of the isolated lagoons in inland positions. No organic remains (so far as I know) occur in the circular lagoons that would indicate a distinctively marine fauna, and the presence of foraminifera in the Yorketown lagoon may probably be explained as a sporadic colony, introduced at some period by sea birds carrying foraminiferal spawn on their legs, the introduced forms maintaining a precarious existence until either the increasing salinity of the water, or the temporary drying up of the lagoon, led to the extinction of the colony.

Analogous Features in Kangaroo Island.

It may be regarded as a corroboration of the theory advocated in this paper that in Kangaroo Island several lagoons of the same type as those on the Peninsula occur in the north-east portion of the island, and under similar geological conditions. There are the same outliers of Eocene limestone separated by areas from which the limestone has disappeared. The glacial clay underlies the Tertiary limestones, and forms the retentive floors for the drainage. The lagoons also are excavated in this clay with exposure of erratics on their flanks, as has been described in the case of Yorke Peninsula.

Preliminary Note on the Existence of Glacial Beds of Cambrian Age in South Australia.

By Walter Howchin, F.G.S.

[Read April 2, 1901.]

It has recently been my good fortune to discover in our local rocks a glacial "till" of very remote geological age, and of great extent in its stratigraphical outcrop. As the formation in question has been proved at intervals over a line of strike that exceeds 200 miles, considerable time will be involved in making the detailed observations requisite for a full treatment of the subject. I have, therefore, concluded it was best to place before this society, at the earliest opportunity, a preliminary note giving the outlines of this interesting discovery.

During the past year I have paid several visits to the valley of the Sturt River, about seven miles from Adelaide, where the formation referred to first attracted my attention. The Sturt crosses the Adelaide main road near the Flagstaff Hotel, at the base of Tapley's Hill. About a mile up stream from this point the glacial beds are exposed, and for a considerable distance occupy the bed and banks of the river. The outcrop is about a mile and three-quarters wide, and include cuttings on the Hills railway line, as well as the quarry of the Metropolitan Brick Works Company, on its eastern limits.

The glacial beds rise from beneath the thick banded shales of Tapley's Hill, and are underlain by the shales and quartzites of the Mitcham and Glen Osmond series.

The lithological features of the beds are very distinctive, and when once observed can be easily recognised, even in small fragments. As a rule the formation exhibits an unstratified mass, with a mudstone base, and carries stones from the size of small grit, up to erratics several feet in diameter. These are distributed through the mass without order, and at all angles, frequently producing a local contortion in the finer sediment immediately adjacent to them. In places the mudstone is replaced with irregular and unstratified masses of sandstones or coarse grits. It is often impossible to trace the line of junction between the mudstones and these

arenaceous masses, and no lines of bedding can be found showing planes of deposition. These arenaceous masses may or may not contain erratics within their limits, as they vary in this particular. The mudstones show a characteristic weathering, splitting up into large slabs with a flakey exfoliation of the mass. At first these divisional lines might be mistaken for bedding planes; but they are evidently produced by a rough form of cleavage, and are at a high angle. This manner of weathering tends to produce sharp serrated edges along their lines of outcrop.

The true "till" beds are in places intercalated with laminated shales, grits, and thin dolomitic limestones, which do not contain erratics, and are regularly bedded. It is by these regularly stratified beds intercalated with the "till" beds that the true dip of the series can be obtained.

My first sight of this remarkable formation was sufficient to convince me that I stood face to face with a true glacial deposit, but repeated searching in the Valley of the Sturt failed to produce any indisputable evidence of glacial wear on the faces of the included boulders.* The shape of many of these boulders was often suggestive of ice action, but confirmation was needed to place the question beyond doubt. Such negative results may, perhaps, be explained from the fact that the included igneous rocks are generally much decomposed; whilst others, less liable to atmospheric influences, as quartz and quartzites, are frequently covered with a shaly skin, left by the matrix, which effectually hides the striation of the surface if existing on the stone.

I ascertained from several sources that "boulder beds" were seen in outcrop to the north of Adelaide, and, in search of fuller proofs of glacial action (if such were obtainable), I paid a visit, at the close of last year, to the neighborhoods of Jamestown, Petersburg, and Oodla Wirra, nearly 200 miles north of Adelaide, and obtained very definite confirmatory evidence. The glacial beds in these northern districts appear to have a very wide, if intermittent, spread.

At the Mount Grainger mine, seven miles north from Oodla Wirra, two rather thin "till" beds occur, intercalated with regularly bedded formations. At Petersburg, about 23 miles to the south-west of Oodla Wirra, there is a very extensive development of the glacial beds. The line of strike takes these beds close to the township, and can be seen in a wide belt of outcrop extending for many miles in the direction of the strike. To the northward of the town they form

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*Since this was written good examples of glaciated boulder hove been obtained.

a leading geological feature in the Petersburg Ranges, along which I followed their outcrop for a distance of sixteen miles. In some places fine mural exposures of the "till" were met with, and large boulders of quartzite, granite and other kinds of igneous rocks, weathered out from the "till," lie strewn upon the surface.

Jamestown is situated about twenty-one miles to the south-west of Petersburg. In the Belalie Creek, about one mile east of the town, the junction of the "till" beds with the overlying "ribbon," or banded, shales of the Tapley's Hill formation is well seen. The outcrop can be traced across the railway line, and occupies the rises on its northern side. On the cultivated land the farmers of the neighborhood have been at much trouble to clear the ground of the erratics, which are in great numbers, and in places the task has been too much to attempt, so that the stony ground is left in a state of nature. In one spot, near the boundaries of Mooreland's Farm, a fine field of erratics can be seen strewing the ground of all sizes up to nine feet in diameter.

The northern exposures of the "till" beds differ in one important particular from those of the Sturt Valley. In the latter locality but few boulders are found lying on the surface of the outcrops, whilst in the north such free erratics are extremely plentiful, probably arising from the more rapid weathering of the beds. This extensive weathering is a feature of great importance, as it permitted a freer examination of the erratics than is possible in the formation near Adelaide.

The crowning result of these observations in the northern districts, and one that has placed the question of the glacial origin of the beds beyond all doubt, was the discovery of glaciated stones of the most distinct and characteristic types. A large limestone boulder and several quartzites have been obtained which show glacial facets as well as groves and striæ.

I have ventured to refer the glacial beds described in this preliminary note to Cambrian age. At present this is only a matter of inference, but the weight of evidence seems to point in that direction.

I do not think they can be regarded as newer than the Cambrian, as they underlie a thick series of shales and limestones, so little altered that, had the latter been of more recent date than the Cambrian, they might reasonably have been expected to carry some palæontological evidence of their age; but, with the exception of *Radiolaria*, they have given negative results after repeated searchings. Further, the "till"

beds have a dip which, if persistent, would bring them under undoubted Cambrian beds at a few miles distance.

At the same time, I can scarcely see how the beds in question can be referred to a Pre-Cambrian age, as the inclusions of sedimentary rocks, such as quartzites, metamorphic shales, and limestones among the erratics, demands a pre-existing sedimentary series from which they have been derived, and which may be assumed to be of Archæan age. This discovery marks, so far as I am aware, the first observation of a Cambrian glacial age in the Southern Hemisphere, and is probably the most extensive exposure of its kind in any part of the world.

I have to express my great indebtedness to Mr. John Heithersay, who, from his intimate knowledge of the country around Mount Grainger and Petersburg, gave me very valuable assistance in carrying out my observations in that district.

A South Australian Meteorite.

Plate I.

By G. A. Goyder, F.C.S.

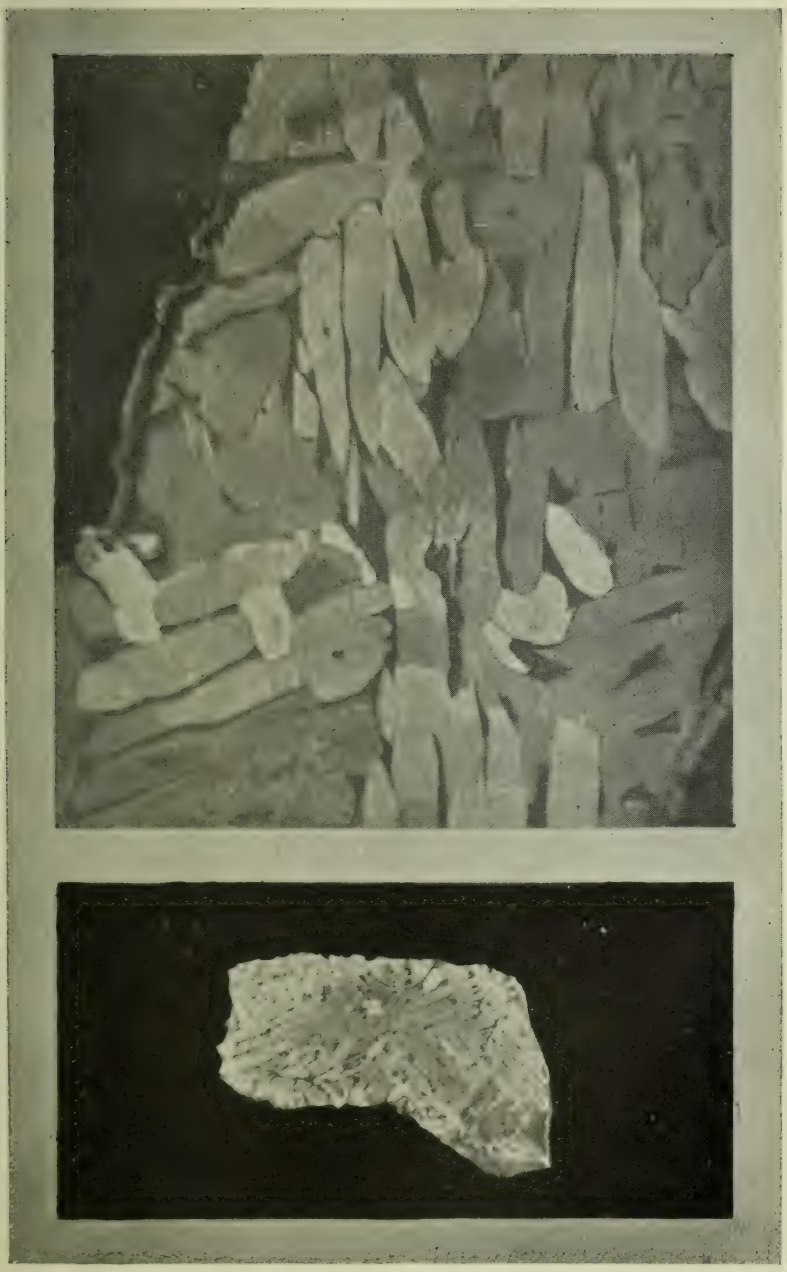
[Read April 2, 1601.]

This siderite was brought to the School of Mines for determination by Mr. H. W. Payne, of Rhine Villa, who states that it was found on the surface partly covered with soil, and that there were no other stones of a similar nature to be seen about the surface except one or two little flakey pieces which appeared to have fallen off the one sent. These pieces were lost in digging to try and find more large pieces. He also states that no one had seen a meteor fall in that locality. The meteorite, when received, had been a good deal knocked about with a hammer, and some of the prominences on it thus flattened; on the untouched surfaces it carries a thin coating of oxide, but does not show any wavy lines of flow. The photographic representation herewith of natural size shows the general contour and thumb-like depressions. The weight is 3,325 gms. (7½ lbs.) Specific gravity, 7.693.

A piece was sawn off, ground, polished, and etched with dilute nitric acid, which brought out the Widmanstätten figures very prominently, as seen in the accompanying drawing. Twinning lamellæ (Neumann lines) could also be seen on parts of the section, especially with a magnifying glass, but hardly in the photograph representation. This siderite appears to consist principally of *kamacite*, with thin plates of *taenite* between the *kamacite* blades, small veins and also grains of *troilite* are sparsely scattered through the section and from the quantity of phosphorus found by the analysis, *schreibersite* is also probably present.

Analysis by Mr. W. S. Chapman.

Insoluble in aqua regia	0.03
Iron	88.85
Nickel	9.07
Cobalt	0.34
Sulphur	0.75
Phosphorus	0.27
	99.31



Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

XXVIII.

[Read April 2nd, 1901.]

Through the obliging mediation of my good friend Dr. Horn of Berlin I have been brought into communication with Professor Kolbe of the Royal Museum at Berlin, who has done me the distinguished favor of entrusting to my hands for examination the type specimens of a number of the Tasmanian Coleoptera described by Erichson in 1842. This generous loan has enabled me to clear up some of the enigmas of the Australian fauna and to assign to their proper places various species which in former papers I have been obliged to pass over as incapable of certain identification, especially in the genus *Heteronyx* and the family *Curculionidæ*. The results of my studies of the above-mentioned types will be found in the following pages.

CICINDELIDÆ.

CICINDELA.

C. Jungi, sp. nov. Modice elongata, sat parallela; viridis vel cuprea, labro mandibulis (his apicem versus nigricantibus) elytrisque albidis (his macula viridi communi elongata, basin attingenti, longe ante apicem desinenti, ad latera apicemque varie sinuata, ornatis); capite inter oculos (his valde prominulis) fortiter convexo, clypeo dense niveo-piloso, vertice antice longitudinaliter subtiliter strigato postice subtiliter rugulose punctulato; prothorace sat transverso, niveo-piloso, antice posticeque transversim sulcato, longitudinaliter canaliculato, subtiliter confertim rugulose punctulato, lateribus sat arcuatis; elytris vix perspicue punctulatis, margine postice haud denticulato; corpore subtus (metasterni coxarum posticarum abdominisque parte mediana excepta) antennarum articulis basalibus 4 pedibusque sat dense niveo-pilosis.

Maris tarsis anticis modice dilatatis; feminæ labro 3-dentato. Long., 5—5½ l.; lat., 1⅘—2 l.

The elytra have no markings whatever except the one common green blotch which extends from the base hindward to about the

beginning of the apical one-third of the elytra. This blotch is deeply bi-emarginate on its lateral margins and also emarginate on its hindmargin. The emargination of the hindmargin is in some specimens not deeper than those of the lateral margins, but in other examples is very much deeper (in one even becoming a long cleft extending two-thirds of the distance up the middle of the blotch towards its front margin). This species differs from *C. upsilon* as follows: form evidently more elongate and parallel; elytral markings quite different; clypeus and basal part of antennæ densely pilose; prothorax much more pilose and with less straight sides; head considerably more convex between the eyes; elytra much less distinctly punctured; labrum of female tri-dentate in front. The female examples before me have the apex of the suture distinctly spiniform, but in the unique male there is no trace of a spine; perhaps this is an abnormal specimen.

S. Australia; Yorke Peninsula (taken by Mr. Jung).

CARABIDÆ.

GIGADEMA.

G. rugaticolle, sp. nov. Fem. Elongatum; parallelum; minus nitidum; piceum, corpore subtus pedibusque rufescentibus; capite modico, pone oculos modice angustato, sat sparsim subfortiter punctulato et transversim perspicue rugato; labro sat elongato; prothorace sat cordiformi, quam longiori fere sesquilatiori, canaliculato, in disco toto sat æqualiter sat fortiter transversim strigato, in partibus marginalibus omnibus sat fortiter minus sparsim punctulato, lateribus late deplanatis, basi bisinuata; elytris striatis, striis punctulatis, interstitiis nullo modo convexis, subtiliter (ut striæ) punctulatis, puncturis in interstitiis nonnullis triseriatis; femoribus anticis ad basin subtus obtuse angulatim dilatatis; ligula planata, parte media leviter concava. Long., 16 l.; lat., $5\frac{1}{2}$ l.

This species is distinguishable among its allies by the absolutely flat interstices of its elytra (the puncturation of which is very fine and runs partly in two, partly in three, longitudinal rows) and the strong uniform transverse wrinkling of the disc of its pronotum. Compared with *G. longipenne*, Germ., of same sex, it is of somewhat similar, but a little wider form; its labrum is much more obtuse at the apex; its head does not differ much except in the upper surface being conspicuously strigate transversely; its ligula is of entirely different form; its prothorax does not differ much in outline except in the middle part of the front margin being more prominent; the marginal flattening of the pronotum is much wider and better defined (even more

so than in *G. Bostocki*); the disc of the pronotum is strongly strigate and therefore opaque; the elytral interstices are quite flat and are more finely punctured, the punctures not running in two regular series on each interstice but on the greater part of most of the interstices in three rows; the basal part of the front femora is obtusely and widely angular beneath (in *longipenne* there is a small sharp tooth). I do not know *G. Froggatti*, Macl., or *atrum*, Macl., but it is evident from the descriptions that this present insect is very distinct from them,—the former having the "whole prothorax coarsely punctured" and its elytral interstices being called "ridges;" while the latter is described as having *inter alia* its "head without punctures" and the apical joint of its maxillary palpi triangular.

N.W. Australia.

DIABATICUS.

D. australis, Er. Some time ago I took an example of *Diabaticus* on the Dividing Range, Victoria, which appears to me to be a variety of the Tasmanian *D. australis*. It differs from the type in the front one-third part of its elytra being of the same ferruginous colour as the prothorax. The interstices of its elytra being more absolutely flat than those of *australis* suggest the possibility of specific distinctness, which however could only be decided by examination of numerous specimens. I do not think the insect has hitherto been recorded as occurring on the mainland of Australia.

D. (?) *tumidiceps*, Blackb. and *minor*, Blackb. In Tr. R.S., S.A., 1889, p. 133, I very doubtfully attributed these species to *Diabaticus* provisionally. In Pr. L.S., N.S.W., 1898, p. 494, Mr. Sloane says that they cannot in his opinion stand in *Diabaticus* but require a new generic name. I take this opportunity of saying that I agree with him. As he is, I believe, at present working on the *Lebiides* I leave to him the task of dealing more satisfactorily with their generic position.

SILPHOMORPHA.

S. difficilis, sp. nov. Lata; sat nitida; supra fere tota piceo-nigra, corpore subtus antennis palpis pedibusque rufis; fere lævis, punctura magna in utroque elytro prope scutellum impressa; capite prothoraceque fere æqualibus; elytris obsolete interrupte substriatis, interstitiis vix omnino planis, apice subsinuata anguste rufescenti, lateribus leviter deplanatis. Long., $4\frac{1}{2}$ l.; lat., $2\frac{1}{2}$ l.

This species is notable among its immediate allies by the large puncture on each elytron placed very near to, and about on a level with the hind apex of, the scutellum. The elytra are dis-

tinctly less evidently striate than those of *S. fallax*, Westw., and more evidently than those of *S. decipiens*, Westw. The prothorax is not at all explanate on the sides, the elytra broadly so, but very indefinedly, much less definedly than in *fallax*. *S. lævis*, Cast., is perhaps the species to which the present one is nearest, but it is too briefly described for any clear idea of it to be formed without seeing the type. It seems however to be differently colored having a "reddish lateral margin to the thorax and elytra" (there is no trace of such coloring in the present species) and having the "thorax bi-impressed on the posterior part" (the present species has no inequalities that can be called distinct impressions); moreover it is from a very distant locality (tropical Queensland); the probabilities therefore are decidedly against identity.

N.S. Wales (Tweed R. district).

ADELOTOPUS.

A. micans, sp. nov. Angustus, elongatus (quam *A. filiformis*, Cast., parum latior; nitidus; glaber; antennis palpis pedibus pronoti lateribus elytrorum apice corporeque subtus plus minusve piceis vel rufescentibus; capite sat lævi; prothorace quam longior sesquilatiori, antice parum (quam *A. hæmorrhoidalis*, Er., multo minus fortiter) angustato, sparsim manifeste (quam *A. filiformis*, Cast., multo minus crebre) punctulato, lateribus quam *A. filiformis*, Cast., paullo minus rectis paullo magis late recurvis; elytris ut prothorax (sed apicem versus magis crebre) punctulatis, nullo modo striatis, sutura prope apicem vix subcarinata; prosterno haud carinato. Long., 3 l.; lat., $1\frac{1}{5}$ l.

Resembles *A. filiformis*, Cast., and *aphodioides*, Westw., in its pronotum and elytra being very much more distinctly punctured than those of *dytiscoides*, Newm., *hydrobioides*, Westw., *nemosomoides*, Westw., *hæmorrhoidalis*, Er., &c. From *aphodioides* it differs *inter alia* by its puncturation being much less close and the sides of its prothorax straighter and very much less strongly recurved.

S.A. (Quorn).

A. Tasmani, sp. nov. Angustus, elongatus (ut *A. filiformis*, Cast.); nitidus; glaber; ut *A. micans* coloratus; supra haud punctulatus; prothorace (puncturis carentibus exceptis) fere ut præcedentis *A. micantis* sed lateribus etiam magis anguste recurvis; elytris (puncturis carentibus exceptis) fere ut præcedentis, sed sutura haud carinata; prosterno fortiter carinato. Long., $2\frac{4}{5}$ l.; lat., 1 l.

A very narrow species, of the form of *A. filiformis*, Cast., but differing from that species *inter alia* by its upper surface being

devoid of distinct puncturation even under a strong lens. *A. hæmorrhoidalis*, Er., is much less narrow in form, with the sides of its prothorax very much more strongly narrowed towards the apex. *A. nemosomoides*, Westw., is a still more narrowly elongate form, with the sides of its prothorax quite straight. *Hydrobioides*, Westw., *vicinus*, Cast., *apicalis*, Macl., are all *inter alia* of much less narrowly elongate form.

Tasmania (Lake District).

A. creberrimus, sp. nov. Subovalis, minus angustus, minus convexus; minus nitidus; supra piceus, antennis palpis pedibus prothoracis basi lateribusque elytrorum lateribus et corpore subtus rufescentibus; glaber; capite creberrime ruguloso, genis ut *A. ipsoidis*, Westw., dilatatis; prothorace ut *A. ipsoidis* conformato, supra sat æqualiter confertim ruguloso; elytris totis (humeris summis exceptis) crebre punctulatis, puncturis suturam versus sat magnis sat rugulosis (ut *A. ipsoidis)* sed latera apicemque versus multo minoribus, stria subsuturali manifesta; prosterno carinato. Long., $3\frac{4}{5}$ l.; lat., $1\frac{3}{5}$ l.

Allied to *A. ipsoides*, Westw., but of evidently more elongate form, with the sculpture of the pronotum very much more crowded and evenly distributed and the whole surface of the elytra except a very small space at the shoulders very distinctly punctured. In *ipsoides* the front two-thirds of the inner half of each elytron is strongly punctured (but much less closely than in *creberrimus)* while the external half of each elytron (except close to the lateral margin) and the apical portion are almost punctureless. *Cylindricus*, Chaud., is no doubt another ally of *A. ipsoides;* its prosternum is described as non-carinate. *A. obscurus*, Cast., is stated by Dr. Gestro (Ann. Mus. Gen., 1884, p. 303), on the authority of Castelnau's type and a co-type from Macleay, to be identical with *subopacus*, Macl. I have a specimen of *subopacus*, Macl. (compared with the type), which is a much smaller insect than *creberrimus*, with pilose elytra and the elytral puncturation not interrupted even on the shoulders.

S. Australia (Basin of Lake Eyre).

PROMECODERUS.

P. Sloanei, sp. nov. Fem.? Elongato-ovalis; nitidus; niger, vix æneascens; palpis antennis tarsisque vix picescentibus; capite convexo, sat æquali, labro medio longitudinaliter fortiter sulcato, genis (ut *P. ovipennis*, Sl.) subtus angulatim prominentibus, menti dente medio sat acuto; prothorace convexo, quam latior fere longiori, antice et postice transversim modice impresso, canali mediana longitudinali bene definita obsolete punctulata (hac sulcos transversos attin-

genti, postice subfoveato), lateribus minus fortiter (quam *P. scauroides*, Cast., multo minus fortiter) arcuatis in parte postica summa sinuatis, angulis posticis rectis; elytris modice convexis, subtiliter perspicue striatis (striis perspicue punctulatis), striis 1ª et 2ª antice fortiter extrorsum versis et prope basin conjunctim profunde sulcatis, inter has strias et suturam fovea sat profunda impressa, parte apicali subrugulosa. Long., $5\frac{3}{4}$ l.; lat., $2\frac{1}{5}$ l.

In general shape and build this species resembles an insect sent to me by Mr. Sloane under the name *P. semistriatus*, Cast. Its most striking character consists in the strong longitudinal sulcus of the labrum, which is even more deeply impressed than in any of my specimens of the small group of Tasmanian species notable for that character. The puncturation of its elytra is more marked than in any other specimen of the genus in my collection, extending in regular rows from base to apex and being quite distinct even on the lateral portions; it can hardly be the result I think of immersion in spirits. The sinuation (close to the base) of the lateral margins of the prothorax is stronger than in any other *Promecoderus* known to me. This lateral margin is continued along the base (where it becomes thicker and stronger than on the sides) for about a quarter of the width of the segment and is obsolete in the middle. The prothorax is fully as long as (if anything a trifle longer than) wide by careful measurement. The first and second elytral striæ running into a short deep fovea-like sulcus at the extreme base seems to be a good character. I cannot make up my mind as to the sex of the specimen before me. The front tarsi are not spongiose beneath, but they are very short and wide for a female,—the basal joint scarcely longer than wide and the following three joints distinctly transverse. I can find only one puncture on each side of the hindmargin of the last ventral segment, but as the setæ of the punctures are wanting and the margin itself is slightly damaged I am not sure that there may not have been two punctures on each side. The lateral foveæ of the ventral segments are not linearly produced towards the middle of the segments. The median longitudinal line of the pronotum is much like that in a specimen sent to me by Mr. Sloane as *olivaceus*, Macl. This species is as brilliantly nitid as *P. scauroides*, Cast.

Western Australia (Yilgarn District).

GNATHAPHANUS.

G. Darwini, Blackb. Mr. Sloane (Proc. L.S., N.S.W., 1899, p. 555) says that a comparison of the description of the above insect with that of *G.* (*Diaphoromerus*) *multipunctatus*, Macleay (both published in P.L.S., N.S.W., 1888, Part 2), convinces him

of their identity and that as he feels little doubt of *G. multipunctatus* being identical with *G. impressipennis*, Cast., he thinks *Darwini* is probably in the same case. It seems to me likely enough that my name is founded on the same species as Sir W. Macleay's; in which event, although the two names were published simultaneously my name must sink, as Sir W. Macleay's paper was read before mine; but my *G. Darwini* is perfectly distinct from a Queensland species sent to me by Mr. Sloane as *G. impressipennis*, Cast. (and in my opinion correctly named), from which it differs *inter alia* by its having no punctures on the fourth elytral interstice and none on the front one-third part of the fifth interstice. Unfortunately my *G. Darwini* is a female, and the Queensland specimen is a male,—but I think it very improbable that the female of the Queensland species has such deep elytral striæ or so strongly prominent interstices (which however are flattened,—not keel like,—except close to the base and near the apex) as *G. Darwini*.

LAMELLICORNES.

ANODONTONYX.

A. (Scitala) languida, Er. I have the type before me and find it to be an *Anodontonyx*. It is identical with the species that I regard as *A. nigrolineata*, Boisd. This confirms Burmeister's opinion that the two names are founded on the same insect, but Burmeister makes Boisduval's name the synonym,—whereas the reverse is the case (as Blanchard cites it and as it is quoted in Masters' Cat.).

HETERONYX.

Erichson seems to have overlooked this name altogether as he makes no reference to it in founding his genus *Silopa* to which he refers numerous Tasmanian species. *Silopa* however, as Lacordaire and others have shown, is quite identical with *Heteronyx*. In my "Revision of the genus *Heteronyx*" (P.L.S., N.S.W., 1889, &c.) I was obliged to pass *H. (Silopa) glabratus*, Er., *fumatus*, Er., and *hepaticus*, Er., among the species unknown to me. I have now, through the courtesy of Herr Kolbe, the types of these three species before me and can furnish the following notes on them, assigning to them their places in my arrangement of the genus.

H. glabratus, Er. This species belongs to my Section III., Group I., Sub-group II., having its labrum elevated above the clypeus, its antennæ of eight joints and its claws appendiculate. In my tabulation of that Sub-group it stands beside *H. raucinasus*, Blackb. (P.L.S., N.S.W., 1889, p. 142) along with *H. consanguineus*, Blackb. (a subsequently described species). It differs from both of them by its much less closely and more

strongly punctulate elytra, and from *raucinasus* by its much less closely and less rugulosely punctured head.

H. (Silopa) fumatus, Er. This species belongs to my Section III., Group II., Sub-group II., having its labrum elevated above the clypeus, its antennæ of nine joints, and its claws appendiculate (tabulated in Proc. L.S., N.S.W., 1889, pp. 662, &c.). It is identical with my *H. rapax*, the name of which must consequently sink into a synonym of *H. fumatus*.

H. (Silopa) hepaticus, Er. I cannot see any character of specific value to separate this species from the preceding (*H. fumatus*). I think it is a male and *fumatus* a female. In the two descriptions there does not seem to be any tangible difference beyond that the scutellum of *hepaticus* is said to be sparsely (of *fumatus*, not) punctured, and the elytral interstices in *hepaticus* to be transversely subrugulose. I find these distinctions in the two specimens except that the scutellum of *fumatus* is certainly not absolutely without punctures, though its punctures are very evidently less numerous than those of *hepaticus*. I also observe that the elytral puncturation of *hepaticus* is a trifle closer than that of *fumatus*. And here it may be noted that the puncturation of both scutellum and elytra in the type specimen of *H. rapax*, Blackb., is intermediate between that of Erickson's two species. But these very slight differences do not appear to me sufficient to found species on, at any rate unless a study of numerous specimens should show that they are persistent,—and moreover not sexual.

As I have mentioned previously (P.L.S., N.S.W., 1889, pp. 1243-4) Blanchard considers *hepatica*, Er., a synonym of *australis*, Guér., and I have not sufficient evidence before me to form a decided opinion as to whether he is right. Unfortunately he does not give his reasons for the determination which could not be of much value unless it was founded on an inspection of the types.

H. grandis. In the remarks on this species (Tr. R. Soc., S.A., 1900, p. 113, line 28) "1891" should be substituted for "1892."

DIAPHONIA.

D. seminigra, Kraatz. This seems to me to be identical with *D. Parryi*, Jans.; the latter is the older name. This synonymy has not (so far as I can ascertain) been noted before.

BUPRESTIDÆ.

STIGMODERA.

S. Pallas, sp. nov. Sat lata ; sat nitida ; colore variegata, capite prothoraceque cupreis, elytris stramineis (his fasciis cyaneis 3 ornatis,—1ª basali lata marginem lateralem antice

anguste attingenti in disco retrorsum extensa et in sutura producta, 2ª post-mediana sat lata, 3ª apicali cum 2ª in sutura anguste connexa), corpore subtus aureo-æneo, antennis pedibusque cyaneis (his viridi-micantibus); capite minus elongato, crebre fortiter punctulato, inter oculos profunde concavo, parte inter oculos retrorsum haud angustata; prothorace quam longior sesquilatiori, subgibbo (i.e. antice fortiter declivi), ut caput punctulato, lateribus a margine antico (hoc quam basis fere duplo angustiori) longe pone medium divergentibus (hinc ad basin fere rectis); elytris ad basin subrectis, ad apicem late rotundatis, striatis, interstitiis parum convexis punctulatis, lateribus postice crenulatis; corpore subtus crebre sat fortiter punctulato; unguiculis inermibus. Long., 8 l. lat., $3\frac{1}{5}$ l.

The three strongly contrasted colors of the upper surface (bright copper on the head and pronotum, pale yellow and cyaneous on the elytra) together with the unarmed apices of the elytra render this species easy to identify. It is not unlike *S. cupricollis*, Saund., but in that species the elytra are emarginate and spinose at the apex and there are three zones of yellow on the elytra,—in the present species only two (this is not a sexual difference), &c., &c. The cyaneous markings on the elytra are intricate and difficult to describe. The basal is of very transversely quadrate form and does not reach the lateral margin except very narrowly at the base; it extends backward about one-seventh of the length of the elytra but is triangularly produced about half as far again on the suture. The postmedian fascia (looked at with the apex of the elytra towards the observer) bears a rough resemblance to a tree, the trunk of which is represented by the connection on the suture of the postmedian fascia and the apical blotch. The apical blotch occupies about the apical one-eighth of the elytra, and its front margin is somewhat sinuous. The specimens before me are females.

Thursday Island (sent to me by Mr. French).

S. erubescens, sp. nov. Modice elongata; sat nitida; colore variegata, capite prothoraceque purpureo-violaceis (illo viridi-tincto), elytris in parte anteriori testaceo-brunneis in parte posteriori tertia sanguineis [his notulis cyaneis ornatis,—sc. basi summa sutura parte antica excepta (in hac colore cyaneo postice dilatato) et fascia subrecta mox pone medium sita (hac nec suturam nec marginem lateralem plane attingenti)], corpore subtus antice violaceo postice viridescenti, antennis pedibusque altero adspectu cyaneis altero viridibus; capite sat elongato, crebre minus fortiter (postice magis fortiter minus crebre) punctulato, inter oculos vix concavo, parte inter oculos retrorsum haud angustata; prothorace

quam longior ut 8 ad 5 latiori, ut capitis pars posterior punctulato, lateribus modice arcuatis (latitudine majori pone medium sita) angulos posticos versus subplanatis; elytris ad basin mediam leviter angulatim productis, ad apicem rotundatis, punctulato-striatis, interstitiis sat convexis sparsim punctulatis, lateribus postice haud crenulatis; corpore subtus sparsius minus fortiter punctulato; unguiculis inermibus. Long., 10 l.; lat., $3\frac{4}{5}$ l.

This species bears a certain resemblance to *S. rubricauda*, Saund., but differs from it *inter alia multa* by its glabrous head, differently colored head and prothorax, the presence of a well-defined transverse fascia immediately behind the middle of its elytra. The sanguineous coloring of the elytra occupies the portion behind the fascia. The cyaneous coloring of the suture begins a little in front of the middle and is narrow to the beginning of about the apical one-third of the elytra, where it dilates into an elongate oval blotch which reaches the apex and there is again dilated along the apical margin to nearly the width of its widest part.

Thursday Island (sent by Mr. French).

S. guttigera, sp. nov. Modice elongata; minus nitida; ænea, elytris flavo-testaceis (his ad basin anguste æneis, ad apicem violaceis, guttis sex sat parvis ornatis,—sc. duabus communibus et binis prope marginem lateralem positis), abdomine rufo-testaceo, antennis pedibusque violaceis viridimicantibus, scutello violaceo; capite modice elongato, crebre subfortiter sat æqualiter punctulato, longitudinaliter sat profunde concavo, parte inter oculos postice parum angustata; prothorace quam longior sesquilatiori, fere ut caput punctulato, lateribus pone medium manifeste dilatato-rotundatis, basi quam margo anticus ut 6 ad $3\frac{1}{2}$ latiori utrinque punctura foveiformi instructa; elytris ad basin mediam leviter angulatim productis, ad apicem anguste obsolete emarginatis vix bi-apiculatis, ad latera mox pone basin fortius emarginato-sinuatis, punctulato-striatis, interstitiis leviter convexis sat crebre minus subtiliter punctulatis, lateribus postice subtiliter crenulatis. Long., 8 l.; lat., $2\frac{3}{5}$ l.

In outline and sculpture this species closely resembles *S. Jekeli*, Saund., but it is much smaller, with very different markings and coloring, and with its prothorax notably less strongly transverse and less strongly dilatate-rotundate on the sides, and the foveiform puncture at the middle of the base of the pronotum (so conspicuous in *Jekeli*) is wanting.

Victoria.

CLERIDÆ.

ELASMOCERUS.

E. picticollis, sp. nov. Mas. Elongatus, sat parallelus; pube subtili erecta vestitus; niger vix ænescens, pronoti margine antico (parte mediana excepta) basique elytrorum marginis lateralis parte dimidia antica et abdomine rufo-testaceis; capite confertim rugulose, pronoto paullo minus crebre, elytris etiam minus crebre nec rugulose, minus subtiliter punctulatis; antennarum articulo apicali laminiformi quam ceteri conjuncti triplo longiori; prothorace subcylindrico quam latior sat longiori. Long., $3\frac{1}{2}$ l.; lat., 1 l.

This genus has not been previously reported as Australian. It was founded on some American species with which African ones have since been associated. The antennæ of the male are very remarkable, and probably mimic those of some other insects on which *Elasmocerus* is parasitic,—perhaps *Longicorns* with flabellated antennæ.

Victoria.

TENEBRIONIDÆ.

CHALCOPTERUS.

C. cribratus, sp. nov. Late subovalis, sat brevis; minus nitidus; niger, elytris olivaceo-æneis; capite æqualiter crebre subtilius punctulato, oculorum interspatio quam antennarum articuli basalis longitudo vix latiori; sulcis ocularibus nullis; antennis quam corporis dimidium parum brevioribus, modice robustis, apicem versus perspicue incrassatis, articulo 3° quam 1us 2us que conjuncti manifeste longiori quam 4us 5us que conjuncti manifeste breviori; prothorace quam longior duplo (postice quam antice ut 5 ad 3) latiori, æqualiter crebre subtilius (quam caput paullo magis leviter) punctulato, antice leviter emarginato, a basi antrorsum (superne viso) arcuatim angustato, basi media perspicue minus late lobato, angulis anticis obtusis (sed bene definitis) posticis (superne visis) leviter obtusis (fere rectis); elytris nullo modo striatis, subæqualiter (apicem versus magis confertim) fere ut prothorax sed multo magis profunde punctulatis et puncturis manifeste majoribus seriatim instructis; prosterno medio leviter obtuse carinato; corpore subtus crebre leviter punctulato; femoribus anticis sparsim subtiliter punctulatis; tarsis nigro-setosis, posticorum articulo basali quam ceteri conjuncti vix breviori. Long., 5 l.; lat., 3 l.

In my tabulation of the genus *Chalcopterus* (P.L.S., N.S.W., 1893, pp. 56, &c.) this species falls beside *C. rugosipennis*, Macl., from which it is extremely distinct *inter alia* both in coloring and shape. Macleay's insect is "elongate-ovate" with elytra

"nearly three times as long as wide;" in the present species the elytra are much less than twice as long as wide. The elytral puncturation resembles that of *C. fastuosus*, Germ., but is coarser and sub-asperate with the seriate punctures more evidently larger than the punctures of the interstices. The prothorax, however, is that of the aggregate "E" (on p. 56) while that of *fastuosus* is of the aggregate "EEE" (on page 61).

Queensland.

ŒDEMERIDÆ.

PSEUDOLYCUS.

P. torridus, sp. nov. (Mas.) Elongatus, sat angustus; dense pubescens; ater, prothorace medio et elytris rufis, antennarum basi palpisque picescentibus; capite crebre subtilissime punctulato, antice fortiter elongato; antennarum articulis 3°—10° dilatatis (3° 4° que inter se sat æqualibus, 5° quam 4us paullo breviori vix angustiori, 5°—10° gradatim angustioribus, 4° quam 10us plus quam duplo latiori; prothorace subcylindrico, supra subtilissime punctulato, indeterminate inæquali (certo adspectu prope angulos omnes tumido), lateribus manifeste arcuatis; elytris fortiter 4-costatis. Long., $4\frac{1}{2}$ l.; lat., $1\frac{1}{5}$. l. (vix).

A very distinct species. In my tabulation of the genus (Tr. R. Soc., S.A., 1899, p. 85) it falls at the end, thus,—

AAA. Pronotum not having a median ridge that becomes bifid in its hinder part. Joints 3—11 of the antennæ entirely black .. .. *torridus*, Blackb.

Apart from color this species differs from those (previously described) not having on their pronotum a central ridge diverging hindward in two branches in its hind part, *inter alia* by the much stronger costæ of its elytra.

Queensland.

CURCULIONIDÆ.

EUTHYPHASIS.

E. funerea, sp. nov. Picea, pube fusco-cinerea (hac notulis pallide cinereis et nigris variegata) dense vestita, antennis pedibusque obscure ferrugineis, corpore subtus ferrugineo (in sternis obscuriori); rostro quam latiori fere duplo longiori, sat depresso; prothorace quam latior multo longiori, antice subtubuliformi; hoc cum capite confertim subrugulose subtilius punctulato; elytris punctulato-striatis, ad apicem modice producto-elongatis, interstitiis nonnullis leviter costiformibus. Long., $3\frac{2}{5}$ l.; lat., $\frac{1}{2}$ l.

The black pubescence forms a quadrate patch on each elytron placed somewhat obliquely and considerably behind the middle. The pubescence of lightest color is on the sides of the pronotum

and immediately before and behind the black elytral patch. The general pubescence of the head and pronotum is evidently darker than that of the elytra. This species differs entirely from its previously described congeners in colors and pattern (in these respects it is remarkably like *Ophthalmorychus angustus*, Blackb.). It differs structurally from *E. parva*, Blackb., *inter alia* by its prothorax distinctly (though not strongly) tubuliform in front, its elytra less produced at the apex, its much denser pubescence, and the manifestly subcostiform appearance of some of its elytral interstices.

Victoria (Dividing Range).

MANDALOTUS.

M. crudus, Er. This species is very well described by its author and there is little which an inspection of the type calls for by way of addition, although a considerable number of congeneric species have since been described. It is at once distinguishable from all the *Mandaloti* known to me (and, I think, from the few I do not know) by the sculpture of its elytra which (owing to the presence of numerous obtuse feebly elevated ridges forming a kind of reticulation) presents an areolate appearance somewhat suggestive of the elytral sculpture of the *Colydiid Meryx areolata*, Pasc.,—though the areolation is less sharply defined than in that insect. The type is a male, the mesosternal projection being very decidedly of the form of a blunt spine (as described by Erichson) and therefore very different from that of *M. hoplostethus* (also from Tasmania). To Erichson's description of the hind tibiæ it should be added that at the middle of the inner margin (immediately before the commencement of the curvature of the outline) there is a strong transverse carina which from some points of view looks like a prominent tooth.

M. rigidus, Er. This is certainly the female of *M. crudus*. It has exactly similar elytral sculpture, but differs in being somewhat wider and more robust in form, with the mesosternal spine replaced by a feeble tubercle and the tibia presenting the differences that usually distinguish those of female *Mandaloti* from their males.

M. sterilis, Er. The type of this species is probably a male, but with very feeble sexual characters. I should say that it is identical with *M.* (*Dysostines*) *fuligineus*, Pasc. (judging by the description of that insect). It is distinguishable from all the other *Mandaloti* known to me by its narrow elongate form. The carination of the alternate interstices of its elytra is well defined,—the white spot at the base of the third interstice (mentioned by Erichson) very indistinct. The mesosternum and tibiæ

are as described by Erichson except that the hind tibiæ are more strongly sinuate on their inner outline than I should understand by the term "*subrectæ*" and it should be added that the hind tibiæ are decidedly incrassate,—no doubt a sexual character, also that the suture between the first and second ventral segments is extremely fine and the segments themselves on the same plane.

M. vetulus, Er. I feel no doubt of this being the female of *M. sterilis*. It differs from it (as *rigidus* does from *crudus*) in being of somewhat wider and stouter build with the tibiæ considerably more slender and evidently less sinuate on their inner outline. The elytra have their alternate interstices distinctly elevated. The elytral markings mentioned by Erichson as present in *vetulus* are very feebly defined and to my thinking merely indicative of freshness of condition in the specimen; I attach no specific importance to them.

PERPERUS.

P. (*Nothrodes*) *languidus*, Er. Erichson's generic name is (as noted by Lacordaire) a synonym of *Perperus*. The species is very well described by its author. I cannot separate it from a species of which I have examples from N.S. Wales and Gippsland, which Mr. Lea has sent to me as *insularis*, Schönh., but which I believe to be *innocuus*, Schönh. Unfortunately most of the pubescence is gone from the type specimen of languidus (e.g. the four vittæ described as marking the pronotum), so that it is perhaps not justifiable to say positively that it is identical with *innocuus*, but I can find no structural character on which to separate it. The species that I take to be *insularis*, Schönh, has a broad white lateral elytral vitta, the humeral angles of the elytra much better defined and the elytral interstices less flat,—all of them characters referred to by Schönherr in his description.

P. convexipennis, sp. nov. Piceus, squamis cinereis et fuscis intermixtis vestitus; rostro quam prothorax parum breviori, supra vix manifeste carinato, ad apicem modice dilatato; antennis piceo-ferrugineis, funiculi articulo 2° maris basali sat æquali (feminæ paullo longiori); prothorace quam longior maris haud (feminæ manifeste) latiori, ad latera sat rotundato, supra sat crasse (nec profunde nec confertim) punctulato, fusco-trivittato; elytris fortiter convexis, sat fortiter punctulato-striatis, sutura et interstitiis alternis quam interstitia alia magis convexa, postice fortiter (maris minus fortiter) declivibus; corpore subtus subargenteo-squamoso. Long. (rostr. excl.), $3\frac{2}{5}$ l.; lat., $1\frac{1}{5}$—$1\frac{2}{5}$ l.

Notable for its extremely convex elytra. Looked at from the side the prothorax appears only half as high as the elytra *P. urticarum*, Pasc., approaches it in form but there is consider-

ably *less* difference between its prothorax and elytra in height (viewed from the side). Also in *urticarum* the eyes are less widely separated from each other and the elytral interstices are equal (or nearly so). The other species have their elytral interstices equal.

N.S.W. (Maitland, &c. Mr. Froggatt calls it a vine pest).

ETHADOMORPHA (gen. nov. *Erirhinarum*).

Corpus plus minusve squamosum; rostrum (? utriusque sexus) gracillimum valde elongatum (speciei typicæ quam prothorax sat longius) arcuatum; scrobes præmedianæ, oblique sub rostrum vergentes; antennæ minus elongatæ, scapo oculum haud plane attingenti, funiculo 7-articulato (articulis basali sat robusto sat elongato, ceteris parvis inter se subæqualibus, apicalibus 3 gradatim paullo dilatatis); oculi ovales grosse granulati; prothorax transversus, antice breviter subtubuliformis, lobis ocularibus nullis, lateribus leviter arcuatis, basi subrecta; scutellum minimum; elytra quam prothorax sat latiora; prosternum antice sat emarginatum, ante coxas minus elongatum, longitudinaliter nullo modo concavo; coxæ anticæ fere (sed haud plane) contiguæ; femora inermia; tibiæ anticæ intus ad apicem breviter mucronatæ; tarsi breves sat lati (articulis 3° bilobo, 4° 3^{am} haud superanti); unguiculi minutissimi simplices; segmenta ventralia basalia 2 inter se sat æqualia, 3° 4° que brevissimis.

The very small *Erirhinid* for which I propose this name cannot be referred to any hitherto characterised genus. Its most distinctive feature is in its tarsi which are short and broad, not very unlike those of a *Misophrice* but with a minute claw joint (in the emargination of the third joint) ending in two very small simple divergent claws. In my tabulation of the *Erirhinid* genera of Australia this one falls besides *Omorophius* (Tr. R.S., S.A., 1894, p. 149), from which it is distinguished as follows:—

NN. Ocular lobes wanting.

O. Apical joint of tarsi well developed . . .. .. *Omorophius*

OO. Apical joint of tarsi very minute and not passing third joint ... ... *Ethadomorpha*

It does not resemble *Omorophius* superficially, but has the facies of *Ethas* which however has the fourth tarsal joint normally developed, the prothorax with ocular lobes, &c. Its tarsal structure is nearest to that of *Niphobolus* (of known genera), but that genus has considerably larger claws and very different rostral and antennal characters. The apical mucro of the front tibiæ is very small and little noticeable but I think I am right as to its presence,—though in so minute an insect it is difficult to be quite certain without breaking a specimen.

E. clauda, sp. nov. Nigro picea, pube albida maculatim minus perspicue vestita; rostro capite et pronoto crebre subtilius subaspere punctulatis; elytris subfortiter punctulato-striatis, interstitiis manifeste elevatis subtiliter coriaceis. Long. (rostr. excl.), 1 l. (vix); lat., $\frac{3}{10}$ l.

Victoria (Dividing Range).

CRYPTORRHYNCHUS.

I have before me the types of two species which Erichson referred to this genus.

As Mr. Lea is at present engaged on a Revision of the *Cryptorrhynchides* it would be inopportune for me at the present moment to propose any new names for members of that group. I therefore merely supply the following notes.

C. solidus, Er. A new generic name will be required for this species (and another in my collection evidently congeneric with it). Its very short metasternum *inter alia multa* is inconsistent with its standing in *Cryptorrhynchus*. Its generic characters are as follows:—Pectoral canal ending in the mesosternum and cavernous at apex; pronotum not distinct from the flanks of the prosternum; scape of antennæ reaching (or very nearly so) the front of the eye; tibiæ unarmed externally; hind femora not abnormally dilated; third tarsal joint dilated and bilobed; metasternum very short, its episterna distinct; second ventral segment a little shorter than third and fourth together; scutellum very well defined; first ventral suture enfeebled in the middle; femora feebly toothed beneath. Its specific characters are well described by its author.

C. infulatus, Er. Distinct from *Cryptorrhynchus* by *inter alia* its short pectoral canal, which does not reach back so far as to the level of the front of the intermediate coxæ. Its structural characters are as follows:—Similar to the preceding (*C. solidus*) in respect of the first six characters attributed (above) to it:—metasternum moderately elongate, about same length as the basal ventral segment; claw joint not clothed with large erect scales; tibiæ not longitudinally ribbed (as they are in *Tyrtæosus*); femora not (or but feebly) sulcate beneath; eyes strongly and not particularly finely granulate; pectoral canal comparatively short and wide; all the femora armed beneath with a single tooth, which is placed at or about the middle; under surface of all the femora much depressed though scarcely sulcate; elytra tuberculate and fasciculate; rostrum considerably flattened above in all its length; second ventral segment much shorter than the first and shorter than the third and fourth together. Erichson's description of the specific characters is a good one.

ACALLES.

A. rubetra, Er. The type of this species differs from European species of *Acalles* (*e.g.*, *roboris*, Curtis) *inter alia* by its hind femora being very strongly and suddenly claviform in their apical portion, the dilatation entirely on the upper outline. Its general characters are as follows :—Similar to *Crypt. solidus* in respect of the first four characters attributed above to that species—third tarsal joint dilated and bilobed; metasterum very short, its epimera not distinctly visible; femora unarmed, somewhat sulcate or at least flattened beneath (not evenly convex as in *Poropterus*); the basal two ventral segments with a strong common longitudinal median sulcus in which the first ventral suture is effaced; pectoral canal not quite reaching back to the level of the front part of the intermediate coxæ; elytra tuberculate; scutellum invisible.

ANTHRIBIDÆ.

CACEPHATUS.

C. sericeus, Blackb. This species was taken in Victoria. The record of the place of capture was omitted when the insect was described (T.R.S., S.A., 1900, p. 152).

TROPIDERES.

T. musivus, Er. I have the type of this species before me. There is no need to add anything to its author's excellent descrip. tion from a specific point of view. I do not think, however, that it can stand as a *Tropideres*, *inter alia* on account of its antennæ so long as to reach the base of the elytra and its small widely separated eyes. In my tabulation of the genera of Australian *Anthribidæ* (Tr. R.S., S.A., 1900, p. 143) it stands beside *Cacephatus*,—its antennæ however being *scarcely* longer than the head and prothorax together. I cannot, however, refer it to that genus on account of its depressed form, its anterior coxæ quite widely separated from each other, its eyes comparatively small and widely separated from each other, and its much longer and narrower rostrum not forming with the head a continuous plane surface. Its depressed form and style of markings are very suggestive of my *Entromus dorsoplagiatus* with which (*loc. cit.*) I conjectured that it might be congeneric; but *inter alia multa* its entirely different antennæ and rostral scrobes show that conjecture to have been very wide of the mark. I regard it as the type of an undescribed genus.

LONGICORNES.

PHACODES.

P. modicus, sp. nov. Subelongatus; sat robustus; obscure ferrugineus, piceo - variegatus, antennis (articulorum apice

excepto) palpis coxis pedibusque rufescentibus ; pube grisea et fusca intermixta vestitus ; prothorace quam longior vix latiori, crebre aspere punctulato, carina longitudinali mediana interrupta et tuberculis opacis discoidalibus nonnullis instructo, antice quam postice haud angustiori, lateribus leviter arcuatis ; elytris inæqualiter punctulatis, sparsim granuliferis (granulis a basi retrorsum gradatim minoribus), ad apicem fortiter emarginatis ; antennarum articulis 3°—5° ad apicem breviter spiniferis, 3° quam 1us manifeste (quam 4us multo) longiori.

Maris antennis quam corpus vix (feminæ manifeste) brevioribus. Long., 8—9 l.; lat., $2\frac{3}{5}$ l.

The pubescence of the head and pronotum is of a somewhat uniform fuscous color with a tendency to be paler on the sides and tubercles of the latter. The derm itself of the elytra is variegated being in general dull reddish but with an interrupted blackish vitta on a wide feebly elevated longitudinal space traversing the disc. The blackish parts of the elytra are glabrous or nearly so ; the reddish parts are clothed (neither very closely nor very evenly) with pale brownish pubescence ; the evenness of the pubescence is also much interrupted by the granules and punctures of the elytra. The punctures of the elytra vary greatly in size some of them being very large and coarse. The previously described species of *Phacodes* having the apex of the elytra emarginate are *bella*, Blackb., and *tenuitarsis*, Pasc.; of these the former *inter alia* has the basal part of the elytra very much more strongly and closely granuliferous ; the latter is much smaller, with joints 3 and 4 of the antennæ almost equal.

N.W. Australia (Masters).

NOTOCERESIUM (gen. nov. *Callidiopsidarum ?*)

Mas. Palpi maxillares sat elongati, articulo ultimo sat elongato vix triangulari ; palpi labiales brevissimi ; caput transversum subrotundatum, antice sat fortiter declive, pone oculos subite angustatum ; antennæ quam corpus multo longiores, articulis 1° 5° que inter se sat æqualibus, 3° quam 5us et 4° quam 3us paullo brevioribus ; oculi fortiter granulati, intus sat fortiter emarginati, inter se latissime remoti ; prothorax fortiter transversus, supra æqualis, antice et postice sat æqualiter angustatus, lateribus ad medium angulatis et tuberculo minuto armatis (hinc antice et postice recte convergentibus) ; scutellum modicum ; elytra valde elongata sat parallela, postice inermia ; pedes sat elongati, femoribus sat compressis leviter clavatis (posticis abdominis apicem nullo modo attingentibus), tarsorum posticorum articulo basali quam 2us 3us que conjuncti paullo longiori ; coxæ antice

contiguæ prominentes, ad latera paullo angulatæ ; mesosterni epimeris coxas intermedias haud attingentibus ; corpus elongatum sat parallelum, sat glabrum.

This is one of the most anomalous Longicorns I have seen. It will not fit into any of M. Lacordaire's "Groupe's" satisfactorily but I think it is best regarded as an aberrant *Callidiopsid.* It is certainly a "*Cerambycid vrai*" (according to Lacordaire's classification) and its strongly granulated eyes place it in the first "section" of that aggregate. The epimera of its mesosternum not nearly reaching the intermediate coxæ, its very short head widely transverse and as broad as the prothorax, non-spinose antennæ, non carinate tibiæ, the even surface of its elytra, and its very inconspicuous antenniferous tubercles refer it, without any hesitation, in the tabulation of that aggregate, to the groupe *Callidiopsides ;* but the form of its front coxæ is very different from the form of those organs in any previously described *Callidiopsid* known to me. It is true that Lacordaire mentions a tendency to abnormal prominence of the front coxæ in *Diatomocephala*, &c., which he nevertheless places in the "groupe" in question, but in the present insect the coxæ are much more prominent than in *Diatomocephala* and moreover are contiguous.

N. impressiceps, sp. nov. Mas. Elongatum, sat angustum, parallelum ; sat nitidum ; testaceo-brunneum, elytris non-nihil obscurioribus ; sat glabrum, capite quam prothorax haud angustiori, inter oculos lato sat plano, linea longitudinali mediana fortiter impresso, sparsim leviter sed vix subtiliter punctulato, clypeo a fronte sutura manifesta diviso ; pronoto ut caput punctulato, æquali ; elytris quam prothorax parum latioribus, puncturis sat parvis crebre fortiter impressis ; corpore subtus sparsim inæqualiter punctulato. Long., 2—3 l.; lat., $\frac{1}{2}$—$\frac{2}{3}$ l.

Tasmania (Lake District).

OPSIDOTA.

O. sculpticollis, sp. nov. Rufo-fusca, pilis griseis (in elytris pedibusque sparsim, in ceteris partibus sat dense) vestita ; capite quam *O. albipilosæ*, Pasc., paullo minus brevi, sat inæquali, crebrius subtilius punctulato ; antennis quam corpus paullo longioribus, articulis (basalibus 2 exceptis) manifeste compressis apicali appendiculato ; prothorace leviter transverso, supra vermiculato-ruguloso sed areis minus concinne definitis subconvexis lævibus nitidis ornatis, lateribus subrectis, latitudine majori prope apicem sita ; elytris lineis vix elevatis 2 minus perspicue instructis, basin versus crebre subrugulose sat fortiter (hinc retrorsum

gradatim minus fortiter minus rugulose,—apicem versus sublævibus) punctulatis; tarsis sat latis (ut *O. albipilosæ*, Pasc.). Long., $9\frac{1}{2}$—$11\frac{1}{2}$ l.; lat., $2\frac{1}{2}$—$2\frac{4}{5}$ l.

The basal joint of the antennæ is quite as strongly arched as in *O. albipilosa*, the first, third, and fourth joints about equal in length, the following joints longer. The nitid spaces on the pronotum are a wide median continuous vitta, a round spot on either side close to the front, and a basal fascia (ill developed) which is conspicuously produced forward and obliquely outward to the front margin but becoming ill-developed in front. This species can be at once distinguished from all the previously described *Opsidotæ* by, *inter alia*, the large and conspicuous nitid spaces on its pronotum. I am uncertain of the sex of the two specimens before me but I judge them to be males from the strong appendiculation of the apical joint of their antennæ and the shortness of their apical ventral segment. The antennæ are less strongly compressed than in the male of *albipilosa* and the head is not quite so short as in that species, but it is very much shorter than in *Strongylurus*.

N. Queensland (Port Mackay; sent by Mr. French).

PROSOPLUS.

P. (*Niphona*) *torosa*, Pasc. There is a specimen from N.W. Australia in the S. Australian Museum agreeing so well with the description of this species that I cannot doubt its identity. Mr. Pascoe gives "S. Australia" as the habitat. I have never, however, seen an example taken in S.A., nor do I know of any *Coleoptera* (except some well-known to be found all over Australia) common to S.A. and N.W.A. I suspect therefore that Pascoe's statement of habitat is incorrect unless it designates "the Northern Territory" under the term "South Australia."

ANCITA.

A. dispar, sp. nov. Picea, tomento cinereo ochraceo et fusco variegata, labro antennis pedibusque plus minusve rufescentibus; capite prothoraceque dense subgranulose punctulatis; hoc ante medium transversim sulcato, utrinque in dorso sat fortiter gibboso et ad latus tuberculo magno acuto armato, linea mediana plus minusve impressa et granulis magnis nitidis nonnullis instructo; elytris costulis discoidalibus binis tuberculis binis parvis anticis (his oblique paullo pone basin positis) et tuberculis 4 vel 5 posticis (his transversim sat longe pone medium positis) ornatis, fortiter sat crebre punctulatis; antennis 11-articulatis.

Maris antennis quam corpus sat longioribus, feminæ elytrorum apicem vix attingentibus. Long., $5\frac{3}{5}$—$6\frac{1}{2}$ l.; lat., $2\frac{1}{3}$—3 l.

This species is easily recognisable by the arrangement of the

tubercles on its elytra. A small conical and very conspicuous tubercle stands just within and behind the humeral callus, and there is another similar to it between it and the suture but further from the base of the elytra. At the summit of the hind declivity of each elytron is a transverse row of four or five tubercles, which in the two females before me (one of which I regard as the type of the species) are similar to the subbasal tubercles, but in the unique male (attributable I think to this species) are much smaller.

The disposition of the variegated pubescence is very intricate and difficult to describe. It produces the following arrangement of colors;—the head is dark fuscous with the cheeks and a broad stripe down the middle whitish; the pronotum is of a more or less pale brown with on either side of the middle line a large dark brown subbasal blotch edged externally by some very pale pubescence. The elytra in the two females are intricately mottled with dark and pale brown,—the latter in one of them *very* pale, in the other strongly ochraceous. In the male example the external portions of the elytra are mottled as in the female while the rest of their surface is almost entirely ochraceous. The undersurface and legs are of ashy color thickly peppered with small black spots. Joints 3—7 of the antennæ are whitish except near the apex (much more conspicuously in the male than in the female), and the close and somewhat elongate hairs fringing the antennæ beneath are of the color of the pubescence from which they spring.

It is just possible that this insect is *A. crossotoides*, Thoms., but the description under that name is too slight for confident identification, and moreover (even such as it is) does not agree with the present species. It describes the elytra as having four fasciæ of black pilosity and also some black tubercles. If these four fasciæ be taken as "two on each elytron" their number would seem to suggest the idea of their referring to the series of tubercles mentioned above as present in this insect, but in that case their color does not agree, nor can I find any way of counting the tubercles so as to make four transverse rows *and* some tubercles besides.

N.W. Australia.

A. didyma, sp. nov, Nigricans, tomento griseo ochraceo et nigricanti variegata, labro testaceo, antennis pedibusque picescentibus; capite prothoraceque dense subgranulose punctulatis; hoc ante medium transversim sulcato, utrinque in dorso sat fortiter gibboso et ad latus tuberculo magno acuto armato; elytris inæqualibus (sc. puncturarum interstitiis irregulariter elevatis, certo adspectu lineas varie dispositas formantibus), basin versus cristas binas (altera

oblique, altera sat transversim, posita) pone medium lineam fortiter contortam (hac quam lineæ ceteræ magis perspicua) ferentibus, fortiter sat crebre punctulatis; antennis 12-articulatis.

Maris antennis quam corpus multo (feminæ paullo) longioribus. Long., 5—7 l.; lat., 2—3 l.

Distinct from previously described species by *inter alia* the rugulosities of the elytra. These organs present an unusually coarse appearance owing to the interstices of the punctures being much raised and here and there running together into transverse or oblique wrinkles among which the longitudinal costulæ (usual in the genus) are little apparent. Within and behind the humeral callus is an oblique crest; close to it but not touching it (and nearer to the suture) is another similar one placed more transversely. These crests are not pilose and have a sharply carina-like contour. About the summit of the posterior declivity an elevated line leaves the suture and runs obliquely forward and away from the suture till it reaches the inner one of the longitudinal costulæ where it turns at a sharp angle and runs obliquely hindward a short distance and then turning again runs obliquely forward to the external one of the longitudinal in which it loses itself. These crests and lines are blackish and form the darkest part of the elytra. There are no defined pubescent markings on the upper surface, pale and dark pubescence (with a preponderance of the latter) shading off into each other in a variable manner. The under-surface and legs are piceous more or less reticulated with pale pubescence. Joints 3—12 of the antennæ are cinereo-pubescent at the base with the apex dark (successively less widely dark, joint by joint).

N.W. Australia.

ZYGOCERA.

Z. concinna, sp. nov. Nigro-picea, labro palpisque testaceis; pube cinerea nigraque variegata, hac fasciam postmedianam flexuosam formanti; capite cinereo-villoso, postice nigro-4-maculato; antennis quam corpus multo longioribus, articulo 3° quam 1us 2 que conjuncti paullo longiori, articulis 3° ad apicem et 4°—11° ad basin apicemque albidis; oculorum lobo inferiori fere ut *Z. bifasciatæ*, Pasc. (i.e., sat magno sat late ovali minus oblique posito) sed paullo magis subtiliter granulato; prothorace transversim trisulcato, haud nigro-lineato sed maculis nonnullis nigris ornato, fortiter transverso, utrinque ante basin tuberculo sat conspicuo et ad latus tuberculo magno acuto (quam *Z. bifasciatæ* majori magis acuto) armato; elytris ad basin tuberculo sat magno nigro armatis, in disco manifeste bicostulatis, ad apicem emarginatis et bispinosis, cinereo-pubescentibus, pube nigra macu-

latim vix seriatim (et pone medium fasciatim) variegatis; pedibus cinereo-pubescentibus, nigro variegatis (præsertim posticis); sternis ut *Z. bifasciatæ* conformatis; segmentis ventralibus cinereo-pubescentibus, in medio et utrinque maculatim nudis. Long., 6 l.; lat., $2\frac{2}{5}$ l.

This species differs *inter alia* from those previously described as follows; from *metallica*, Westw., and *pruinosa*, Boisd., by the presence of transverse impressed lines on the pronotum, from *bifasciata*, Pasc., by the presence of basal tubercles on the elytra, from *luctuosa*, Pasc., and *plumifera*, Pasc., by the elytral tubercles not being clothed with long soft pale pilosity, from *lugubris*, Pasc., *cuneata*, Pasc., and *Mastersi*, Pasc., by the presence of dorsal tubercles on the pronotum, from *pentheoides*, Pasc., by the emargination of the apex of the elytra, from *pumila*, Pasc., by the very large and acute lateral tubercles of its prothorax. *Z. canosa*, Er., is very differently colored, and has very different markings (if I am right in my identification of *Z. canosa* with a species I collected in Tasmania it differs also in structure,—e.g., the form of the prosternum). I have not seen the description of *Z. niveosignata*, Jord., but the name would be an impossible one for the present species, which has no white markings on either its upper or under surface. As I am not certain of my identification of some of Pascoe's species being correct I have not mentioned, in distinguishing the present species from them, any of their characters that are not mentioned in their descriptions. I am doubtful as to the sex of the type. I may mention here that valuable specific characters in the *Zygoceræ* (not mentioned by Pasc.) are to be found in the structure of the eyes and of the sterna.

N.W. Australia; sent to me by Mr. Masters.

Z. bifasciata, Pasc. Mr. Masters has sent me a specimen taken in N. Queensland in which the ante-median dark fascia of the elytra is wanting, but which in other respects seems to be identical with *Z. bifasciata*.

PENTHEA.

P. tigrina, sp. nov. Fem. Robusta; pube albida ochraceaque maculatim et vermiculatim variegata; capite supra sat convexo-elevato, subtilius sparsissime punctulato, longitudinaliter impresso, clypeo antice lato truncato; tuberibus antennariis (ut *P. sannionis*, Newm.) magnis prominulis subapproximatis; antennis quam corporis dimidium paullo longioribus, subtus disperse ciliatis, articulis 3°—9° basin versus niveo-pubescentibus, articulo 3° quam 1us et quam 4us parum longiori; oculis ut *P. sannionis* granulatised multo minoribus; prothorace fortiter (quam *P. sannionis* multo magis) transverso, fortiter granulatim et transversim

ruguloso, ad latera 4-gibbosis (gibbis medianis 2 quam ceteræ multo majoribus); elytris 3-costatis (costis plus minusve granula conjuncta simulantibus), inter costas granulis (his inter se magnitudine valde diversis) in parte basali dimidia ornatis, ad apicem rotundatis vel vix subtruncatis. Long., 11—12½ l.; lat., 4—4½ l.

The pubescence of the upper surface is almost identical with that of *P. Saundersi*, Pasc., except in nearly all the pubescent patches being (instead of entirely white) white variegated with bright ochraceous colour, and there being an irregular space behind the middle on which there is very little pubescence, so that an ill defined dark fascia (interrupted or nearly so at the suture) can be traced. The under surface and legs are very uniformly mottled with black and white much as in *P. intricata*, Pasc., but with the black spaces larger and more conspicuous.

This species differs from those resembling it in colour, size and style of marking as follows, *inter alia*;—from *costata*, Pasc. (according to description,—I am not sure that I know the insect), by the ochreous colour of the markings of the upper surface and by the markings on the elytra being vermiculate (as in *Saundersi*, Pasc.) in form,—no continuous pubescence along the sides or elsewhere;—from *Saundersi* by its differently coloured pubescence and non-rugulose head;—from *intricata*, Pasc., by its antennal tubers much larger and more prominent and placed nearer to each other and by the very much larger and more numerous granules of its elytra,—from *solida*, Pasc., by the granulate character of its elytral costæ,—from *vermicularia*, Don., by the ochreous colour of its pubescence, the very much stronger prominences on its prothoracic lateral outline, &c., &c.

W. Australia (Coolgardie; Mr. French).

SYMPHYLETES.

S. lentus, sp. nov. Sat elongatus, sat parallelus; piceus; pube pallide fulva dense vestitus, hac pube magis ochracea vix perspicue marmorata, pube latera versus plus minusve dilutiori, pedibus antennisque pube pallida indistincte variegata; capite haud convexo-elevato, linea longitudinali subtili impresso, clypeo antice sinuato; oculis modicis (quam *S. nodosi*, Newm., paullo magis convexis paullo magis fortiter granulatis); antennis quam corpus paullo brevioribus (maris quam feminæ parum magis elongatis), subtus modice ciliatis; prothorace sat fortiter transverso, tuberculis parvis 2 medianis in disco transversim positis (his inter se sat remotis) et 2 basin versus inter se approximatis instructo, margine laterali inæquali (quasi 2 vel 3 tuberculato); elytris sat æqualibus, longitudinaliter 3-seriatim granulatis (seriebus, externa ultra medium continua, ceteris gradatim brevioribus), ad apicem rotundato-subtruncatis et dense pilosis.

Maris segmento ventrali 2° antice area transversim parallela segmentum medium haud attingenti dense pilosa instructo. Long., 7—9 l.; lat., $2\frac{1}{4}$—3 l.

An extremely uniformly coloured species appearing to a casual glance of a continuous pale fulvous tone everywhere except that the elytra are gradually and more or less distinctly paler towards the sides (in one example almost whitish at the palest part), the pale colouring being usually somewhat dilated inward in a subtriangular form slightly in front of the middle. The pubescence is extremely close entirely concealing the derm everywhere and when closely examined is seen to be closely mottled with two slightly different shades,—one nearly pure brown, the other more reddish. Distinctive characters are (*a*) the tubercles,—or rather granules scarcely larger than those of the elytra,—on the pronotum (two widely separated and placed transversely on the middle of the disc and two similar ones placed transversely close together considerably behind the other pair, also several on the lateral outline); (*b*) the regular longitudinal rows of granules on the elytra,—the subsutural row very short, the next longer, the external row passing the middle of the elytra,—these granules being glabrous; (*c*) the antennæ shorter than the body in both sexes; (*d*) the unusual form of the pubescent area on the (apparently) second ventral segment of the male which appears like a mere transverse band of pilosity not nearly reaching the middle of the segment,—its hind margin straight. The apex of the elytra is so densely pilose that it is difficult to be sure of its shape: and from one point of view it seems to be rounded, from another feebly truncate.

I cannot make this species fit the description of any of Mr. Pascoe's species of *Symphyletes*, but they are so brief and vague that certainty is scarcely possible. The species that seem to be most like it, however, have elytra either crested or spinose at the base, or at the apex very different from those of the present insect.

N.W. Australia (in S.A. Museum; also sent by Mr. Masters).

S. fasciatus, sp. nov. Sat robustus; piceus, pube cinerea et ochrea sat dense (sed in elytrorum partibus basalibus et apicalibus sparsim maculatim) vestitus, pedibus rufis; capite haud convexo-elevato, linea nigra longitudinali impresso, sparsim punctulato, clypeo antice truncato; oculis sat magnis (quam *S. nodosi*, Newm., perspicue majoribus); antennis subtus sat dense ciliatis; prothorace inæquali (pone apicem transversim late concavo, in disco medio tuberculis parvis 2—his linea subtili connexis—et postice inque lateribus tuberculis subobsoletis nonnullis munito); elytris in parte dimidia antica subseriatim granuliferis sed haud cristatis, sat crebre minus

fortiter punctulatis, ad apicem fortiter emarginatis et bispinosis.

Maris antennis quam corpus sublongioribus, articulo apicali curvato-appendiculato; segmento ventrali basali ad apicem et segmenti 2[i] area angusta basali subparallela (hac segmentum medium haud attingenti) dense ochreo-pilosis.

Feminæ antennis quam corpus brevioribus, articulo ultimo vix appendiculato. Long., 12 l.; lat., 4 l.

Over the whole surface except the elytra there is an even clothing of ashy pubescence vaguely intermingled with ochreous. The antennæ are clothed with ashy fine pubescence the joints beyond the second having their apices (successively less widely) glabrous. The elytra are pubescent across the base to about the distance of the apex of the scutellum; then comes a nearly glabrous zone bearing only a few small pubescent spots and reaching back to about the apex of the basal one-fifth of the elytra; the next zone is densely pubescent (nitid granules however protruding through the pubescence and a somewhat triangular subglabrous space interrupting the pubescence on the lateral margin), its front margin being nearly straight, its hind margin strongly concave; the apical zone (not much less in length than half the elytra measured on the suture, and about one-third measured on the lateral margin) is sparsely studded with small pubescent spots on the almost glabrous derm.

The pubescent variegation of the elytra is much like that in *S. cinnamomeus*, Pasc., and *Rhytiphora latifasciatus*, Pasc.,—from the first of which this species differs *inter alia* by the elytra not being crested at the base and from the other—independently of generic characters—by the deeply emarginate and biapiculate apex of each elytron. If I am correct in my identification of the two species just mentioned they also differ from *S. fasciatus* in their sexual characters.

N. Queensland; sent by Mr. French from Port Mackay.

RHYTIPHORA.

S. uniformis, sp. nov. Fem. Minus elongata; sat parallela; picea plus minusve rufescens, antennis palpis pedibusque manifeste rufescentibus; pube albido-cinerea dense vestita, hac (? exemplis abrasis) in partibus nonnullis carenti sicut maculæ glabræ apparent; capite sparsim subtilius punctulato, supra sat elevato-convexo (fere ut *R. latifasciatæ*, Pasc.), linea longitudinali impresso, clypeo antice angusto triangulariter emarginato; oculis modicis sat fortiter granulatis (fere ut *R. latifasciatæ*); antennis quam corpus sublongioribus, plus minusve pube albida subtili vestitis, subtus pilis sat elongatis sat dense fimbriatis, articulo 3° quam 1[us] fere

duplo longiori; prothorace sat cylindrico, ut caput punctulato, subtiliter transversim rugato, lateribus apicem versus tuberculo armatis; elytris ad apicem truncatis, antice granulis sat numerosis instructis, postice puncturis sparsis impressis. Long., $8\frac{1}{2}$—9 l.; lat., $2\frac{3}{5}$ l.

I have two specimens of this insect before me. It is distinguishable from most of its congeners by its pubescent clothing being all but entirely of a pale ashy colour (the only variegation consisting in a faintly ochreous tone on some parts of the sterna). Probably in a perfectly fresh specimen this pubescence covers the derm everywhere except where it is interrupted by small granules and small sparse punctures. In both the examples before me, however, the humeral region of the elytra and some blotches somewhat behind the middle of the elytra are more or less denuded, but I suspect that this is due to abrasion. Another very distinctive character consists in the form of the clypeus the front of which is much narrowed, its apex being less than half the width of the interval between the lower lobes of the eyes, and being triangularly emarginate,—the sides of the emargination acute. I do not think there is any other intelligibly described species combining the characters of *Rhytiphora* (e.g., head strongly convex above the antennal tubers, eyes not finely granulated) with a clypeus of the form just specified, the basal part of the elytra (as in *R. latifasciata*, Pasc.) without any basal crest or other conspicuous elevation, vestiture of a uniform colour and antennæ strongly and thickly (even more so than in *R. Argus*, Pasc.) fringed beneath with pilosity.

N.W. Australia.

R. Simsoni, sp. nov. Robusta; ferruginea vel rufopicea, antennis (articulo basali excepto) obscurioribus; pube cinerea fulvaque variegata; capite sparsim subobsolete punctulato (sed juxta oculorum lobum superiorem puncturis nonnullis profundis impresso), linea mediana longitudinali impresso, supra sat elevato-convexo (fere ut *R. latifasciatæ*, Pasc.), clypeo antice lato truncato; oculis modice granulatis (quam *R. latifasciatæ* minus fortiter); antennis (articulo basali excepto) pube nigra albidaque variegatis, subtus pilis subtilibus sparsis fimbriatis, articulo 3° quam 1us 2us que conjuncti parum longiori; prothorace quam longior ut $4\frac{3}{4}$ ad 4 latiori, sat cylindrico, vix manifeste punctulato, sat fortiter transversim (et pone medium confuse) rugato, lateribus fere inermibus; elytris longitudinaliter late leviter bisulcatis, in partibus anticis tribus costis brevibus obliquis vel transversis granulisque nitidis inordinatim instructis, sparsim minus fortiter punctulatis, ad apicem subtruncatis.

Maris antennis quam corpus vix brevioribus; segmenti 2^{i} ven-

tralis parte antica dimidia ad latera pilis elongatis pallidis dense vestita.

Feminæ antennis manifeste brevioribus, segmento 2° ventrali normali. Long., 8—10¼ l.; lat., 2⅗—4¼ l.

In a perfectly fresh specimen the upper surface is covered with a very fine grey pubescence scarcely noticeable by the naked eye. On this, markings are formed by longer and denser pubescence of intermingled whitish and ochreous colour, presenting on the head variable spots and lines, on the pronotum numerous small specks, on the elytra a kind of network of spots and blotches which arrange themselves most conspicuously behind the scutellum, on the lateral margin behind the shoulder, in a flexuous fascia behind the middle, and in an aggregate filling up the apex. The markings however are little to be relied upon as they are variable and very easily rubbed off and an even slightly rubbed example does not look as if its markings had ever been as described above. The species, however, is easily recognisable by structural characters,—especially its head almost punctureless but having a few very deep punctures close to the inner margin of the upper lobe of the eye,—its elytra each with two very wide shallow longitudinal impressions not nearly reaching either the base or apex (best seen in abraded specimens),—its elytra studded on the whole front three quarters of their area with strong and somewhat coarse shiny granules and short ridges (not unlike those on the front part of the elytra of *Penthea sannio*, Newm.) which are not at all concealed by the pubescence,—and the male characters on the second ventral segment. These consist of a space on each side extending along the front margin of the segment from the lateral margin nearly to the middle and limited hindward by a curved line joining the extremities of the front of the space and reaching hindward to about the middle of the segment,—the part of the segment not occupied by this space being pubescent and marked uniformly with the other segments, but the space itself being densely clothed with long soft pale hairs.

This insect is very likely to be the *Rhytiphora* referred to by Mr. Gahan (Tr. E.S., Lond., 1893) as possibly identical with *caprina*, Newm., or *mista*, Newm., neither of which is intelligibly described,—or (judged by Mr. Gahan's remarks) recognisable by comparison with the types. The former seems to be much smaller than the smallest specimen I have seen of the present insect and is described as having "dentiform tubercles near the base of the elytra" (very different from the sculpture of the present species), and the latter I take to be an allied but very distinct species widely distributed in Southern Australia of which I have seen many examples.

Tasmania; given to me by Mr. Simson. It is found on *Casuarina*.

C. pauxilla, sp. nov. Picea plus minusve rufescens; pilis subtilibus erectis sat crebre instructa et pube grisea vestita, hac pube fusca et albida intermixta; antennis minus robustis, quam corpus vix brevioribus, articulis singulis pube pallide fusca albidaque confuse variegatis, articulo 3° quam 1us sat longiori; oculis sat fortiter granulatis; prothorace parum transverso, supra sat æquali (longitudinaliter obsolete carinato), lateribus antice dente perspicuo armatis; elytris sat crebre sat fortiter punctulatis, ad apicem rotundatis. Long., $4\frac{2}{5}$ l.; lat., $1\frac{3}{5}$ l.

This species differs in some structural characters from *C. paulla*, Germ. (the type of *Corrhenes*), but I cannot ascertain that any other genus has been founded in which it could be placed and its divergence from *Corrhenes* is scarcely sufficient to justify making it the type of a new genus. Its antennæ are evidently less robust than those of *C. paulla*, its eyes are more strongly granulate, and the lateral tubercles of its prothorax (though similarly situated) are notably better defined.

Unfortunately the descriptions of nearly all the Australian species attributed to *Corrhenes* are of the slightest and most unsatisfactory kind and there is comparatively little in them except loose diagnoses of colour and markings. As, however, these seem to be but little subject to variety (judged by *C. paulla*, Germ.,—the only *Corrhenes* of which I have seen numerous examples) it is perhaps fairly safe to assume that a *Corrhenes* differing markedly in these respects from all previous descriptions is a good new species.

The present insect is covered on the upper surface with close and somewhat coarse pale brown pubescence variegated with dark brown and whitish. The dark brown pubescence forms a line running backward from the inner margin of each eye and continued on the pronotum to about its middle, the two lines being curved in such fashion as almost to meet on the front margin of the pronotum; the dark pubescence also forms a large ill-defined common blotch behind the scutellum. The whitish pubescence is chiefly along the base of the elytra, along the middle part of the suture, and (somewhat behind the middle) on the disc of the elytra where it forms a somewhat wide fascia (with its front and hind margins strongly zigzagged) running obliquely forward from the lateral margin but not reaching the suture. This fascia is much more sharply defined in some examples than in others. The under surface is uniformly covered with pubescence of a whitish brown colour. The antennæ femora tibiæ and tarsi are variegated with dark and light brown pubescence.

Compared with *C. paulla*, Germ., the form is a trifle shorter and more robust, the antennæ are less robust and the separate joints are mottled (or spotted) with light and dark brown (the apical part of each chiefly *dark* brown), the eyes are a trifle larger and distinctly more strongly granulate, the sides of the prothorax are tubercled near the front almost as in a *Micracantha*, and the general arrangement of colours differs considerably. The prosternum and mesosternum subtruncate on their opposite faces and the upper surface clothed with long erect soft hairs are generic characters.

N.W. Australia (sent by Mr. Masters).

Notes on Glacial Beds of Cambrian Age in Far North of South Australia.

By Chas. Chewings, Ph.D., F.G.S.

[Communicated by Prof. Tate.]

[Read May 7, 1901.]

The Note on the Glacial Beds of Cambrian Age in South Australia, read by Mr. Walter Howchin, F.G.S., before the Royal Society of South Australia, has greatly interested me for the following, amongst other, reasons :—While in the service of the Umberatana Trust, in July, 1899, I visited the Worturpa gold discovery, and saw in that neighbourhood a very extensive rock formation that resembles so closely the description Mr. Howchin gives—as published in the *Register* of April 3rd—that I do not hesitate to say that a rock formation identical in character has a very extensive development in the Flinders Ranges, much farther North than Mr. Howchin has had an opportunity of seeing. I may here state that, through having other duties to attend to, it was not possible for me to make more than a casual and very hurried examination of the beds I refer to, and I had to leave the district, much to my regret, without making the close investigation I had promised myself ; and no opportunity has presented itself to me to visit the locality since. I hesitated, in the absence of striæ markings, &c., which I had not seen, to call the beds other than Conglomerate, because (1) Cambrian glacial "till" is not seen every day, and (2) the discovery of such had not been made, to my knowledge, in the Southern Hemisphere at that time ; (3) the boulders in places were rounded off, and (4) to classify the beds as glacial till of Cambrian age, without being sure, was premature. I may say that from the fossils found near Beltana, and lithological and stratigraphical characteristics generally, and also failing to find any trace of fossils, I supposed the beds to be of Cambrian age. It is quite certain they are not younger than the old Palæozoics. I congratulate Mr. Howchin on being the first to discover indisputable evidence of ice action.

Worturpa lies 60 to 70 miles easterly from Leigh's Creek Railway Station. Hereabouts is one of the roughest parts of the Flinders Ranges. Benbonyathe, the highest point, is not far off. In most directions the country is rough and rugged in the

extreme. Bold mountain tops rise here and there. Serrated ridges, with precipitous and over-hanging escarpments, form impassable barriers for miles. The rough boulder-bestrewn creek channels, full of teatree thickets, are about the only possible ways of entrance into this wilderness of hills. Of such is the district where perhaps the grandest developments of this interesting rock formation may be seen.

Fortunately, for the investigation of these beds, fairly accessible places exist. One is in the Balcanoona Creek, two or three miles S.E. of the Stone Hut. The bridle-track from Balcanoona Station to Stone Hut runs right across the outcrop, as does also the creek, in which is a permanent running stream of fresh water. The strata stand vertically, and near to that, at this place, which is one of the best exposures I saw. The outcropping edges would be—speaking from memory—one to two miles across. The strike of the beds is N.E. to N.N.E., and the till, or conglomerate, bands of rock form the core of this range, which we may, for distinctive purposes, call the Mt. McTaggart Range, as a mountain so designated is a conspicuous landmark in it a few miles farther north. I should say that the beds rise eight, ten, and fifteen hundred feet above the plain. On the S.E. side of the beds, the erratics—which in places would weigh many tons—decrease in numbers, and graduate off until the rock is sandstone, quartzite, and farther afield, limestone and mudstone. On the N.W. side the beds are backed up by slate and massive magnesian-limestone bands. In this direction a great development of crystalline limestone occurs of several square miles in extent. This limestone appears as a local and distinctive feature. Away to the south, banded and blue limestone of considerable extent is seen in the south branch of the John Creek, but it bears slight resemblance to the Worturpa white crystalline limestone. I may here state that cupriferous veins occur in all the rocks mentioned. Ironstone blows, with crystals of magnetite, are also seen; and extensive areas of rock are stained black with manganese.

This latter is particularly the case in another place, where the beds have a very extensive development, viz., going north and following the Italowie Creek from the Italowie Gap towards Worturpa. The bridle-track leads over miles of this rock, here composed for the most part of red sandstone and quartzite, filled with erratics. Many of the erratics have been sheared through by earth movements as clean as has the matrix in which they are embedded. The "till" is first seen close to the gorge entrance, and continues for three or four miles. The high hills on either side, and the gorge, are wholly of the same rock formation. From Balcanoona Creek to this exposure is seven or eight miles, and

the same geological conditions continue from the one exposure to the other along the Mount McTaggart Range, and for several miles farther north to the mount of that name. West of the mount, along the bridle-track to the Reward Gold Claim, extensive exposures are seen. It is also probable that the mount itself, and the range that extends farther north, had a similar origin. The same formation quite likely extends to the Arkaroola Creek, and even beyond that. I saw a conglomerate-quartzite west of the Mount Fitton South Mine. It is not within my personal knowledge that beds identical in character do extend away to the south from those exposures I have mentioned, but from what I saw and heard I suspect that the same will be found to exist at intervals right through to Mr. Howchin's "farthest North" point.

The Flinders Ranges have been so often described that a repetition is not necessary here, but I may say that the "till" band or bands herein noticed form a part of the primary rock formations in that range, and were subjected at a distant geological date—earlier than the Cretaceous period—to tremendous earth movements. In the instances under notice the effects of disturbance are everywhere apparent, and it is more than probable—seeing on how vast a scale the rocks have been thrown about, and also how dependent such formations are on the contour of the country during their formation—that the recognisable outcrops will by no means follow a straight course, nor be continuous throughout. The Worturpa exposures, however, to my mind, practically extend the known area over which glacial action obtained in Cambrian times to more than double the longitudinal distance shown by Mr. Howchin, and to have occupied—in general terms—the entire length of the Mount Lofty and Flinders Ranges. The elevated area of land on which the incap rested, and from which the material was derived to build up the till at Worturpa—judging from the dip of the strata over a considerable area—lay to the North, West, and South-West; but this must only be regarded as a suggestion.

That such an interesting and prominent, and I may say historically important, feature should have remained so long undiscovered, shows how little is really known, and how necessary a detailed examination and geological mapping of the State has become.

Descriptions of New Species of Corals from the Australian Tertiaries.

By J. Dennant, F.G.S.

[Read May 7, 1901.]

Part III.

Plate II.

In the present paper I remark further upon the genus *Trematotrochus*, and describe three additional species belonging to it.

In Part I. of this series of articles I placed the genus *Trematotrochus* amongst the Eupsammidæ, in the section Madreporaria Perforata, because both in Tenison Woods' type species, *T. fenestratus*, and in *T. Clarkii*, the new one described, there are intercostal pores in the wall. A similar perforation of the wall is also conspicuous in *T. complanatus* and *T. lateroplenus*, species described in Part II. Since doubt has been expressed by some European writers as to the actual penetration of the mural pores in Woods' species, I take the present opportunity of supplying a drawing of the internal wall, as seen under the microscope by transmitted light. A specimen was hardened with Canada balsam, mounted on a slide, and then divided longitudinally, the inner as well as the outer surface of the mounted half being left intact. That light is now freely admitted through the pores is evident from the drawing (Pl. II., fig. 1). I have next to call attention to two interesting corals, in which the wall, though fenestrated in the manner characteristic of *Trematotrochus*, is not actually perforate. The intercostal spaces are, as usual, regularly crossed by thin transverse bars, with pore-like cavities between; but the latter do not penetrate the theca. In external appearance, as well as in the arrangement of their septa, costæ, &c., these species are analogous to the *Trematotrochi* already described, and I, therefore, include them in the same genus. My revised diagnosis of that genus will, I consider, admit them, the wall being described as incomplete in the intercostal spaces, and regularly fenestrated. By their inclusion, however, it becomes necessary to review the position of the genus itself in the madreporarian series.

Of the seven species now known, *T. Clarkii*, the only Miocene one in the genus, has strong Eupsammian affinities. Two of those figured below, viz., *T. Kitsoni* and *T. declivis*, might

perhaps be described as Turbinolids with a fenestrated wall, while the remainder are intermediate in character. So far as development is concerned, there can be but little doubt that *T. Clarkii*, the Miocene species, has descended from *T. fenestratus*, a widely spread Eocene coral. Again, *T. Kitsoni* is specially characteristic of certain Eocene beds antecedent in age to those from which the closely allied forms *T. complanatus* and *T. lateroplenus* have been recorded. The calice of *T. Kitsoni* is very similar to that of *T. lateroplenus*—and, indeed, almost the only important difference between the two corals is that in the latter the mural pores completely penetrate the wall, while in the former they do not. On the strength of such striking analogies between these species, I venture to suggest that the younger of the two has been derived from the older. I may add that *T. fenestratus* ranges throughout the Eocene, while *T. declivis* is restricted to a single outcrop, which I correlate with the older beds.

The above suggestion of mine touches, of course, upon a debateable question, viz., the development of the perforate type of corals from the non-perforate. Instead of attempting to discuss this subject myself, I prefer to direct attention to the able remarks made upon it by Dr. J. W. Gregory in the Introductory Note to his Monograph of the Jurassic Corals of Cutch.* It will be seen by the following short extract from that work that the genus I am now dealing with is regarded as an important factor in the question at issue :—

"It is true that there are some remarkable resemblances between the three families of Perforata and the three groups of non-perforate Madreporaria. The simple Eupsammidæ are in many ways like the Turbinolidæ. . . The parallelism between the groups of cainozoic Perforata and mesozoic non-perforate corals may be either a case of homoplastic modifications in two series of corals, or it may indicate that the three families of Perforata have descended from different members of the non-Perforata, the porous character of the later corals being independently acquired, like the bipedal habit of birds, of some reptiles and some mammals.

"The latter explanation would necessitate the dismemberment of the group Perforata, and it appears to be supported by the asserted occurrence of mural pores in some Turbinolidæ. This assertion rests in the main on *Trematotrochus*, a genus founded by J. E. T.-Woods. . . So far as I am aware, no specimen has been seen in Europe, and the only figure available is the original published by Woods. . . The coral may be one of the Eupsammidæ."

* Pal. Ind., ser. IX., vol. II., part II. (1900).

Reference has also been made to this genus by Dr. Maria M Ogilvie, who states that pores are present in its theca in the same position as the intercostal dimples of *Turbinolia*, and in the same position as the pores in the thecæ of *Turbinaria*, *Porites*, and *Madrepora*.* But by Miss Ogilvie's scheme for the classification of corals, which is based on the microscopic study of the skeletal features, the two families of Turbinolidæ and Eupsammidæ are not only placed far apart, but they are regarded as sprung from separate main trunks.† Her conclusions appear to be contradicted by the Australian genus under review, which, with a Eupsammian-like wall, has yet certain affinities with Turbinolids.

Further consideration of the classification of *Trematotrochus* will be best postponed till the present series of papers is completed.

The species now to be described are the following:—

Trematotrochus Kitsoni, *spec. nov.* Pl. ii., figs. 2*a*, *b*, *c*.

Corallum small, free, and compressed. It is a flattened cone in shape, with a rounded, sub-acute apex. Calice shallow and elliptical, with its diameters in the ratio of 100 to 75.

Septa granular, and in six systems with four cycles, of which the fourth is developed only in the end systems. In this respect the coral resembles *T. lateroplenus*. The primaries are stout, and the remaining cycles diminish in thickness according to order. As a rule, the septa are free; but, as in the type calice, some may be irregularly united towards the columella by means of intermediate solid tissue. Stereoplasm is also developed to some extent in the interseptal loculi.

Columella elongate, nodular at its upper surface, and almost spongy inferiorly. The primary and secondary septa are fused with it either directly or by means of thin processes. There are no pali, but the thickened ends of some septa, chiefly the secondary, may be regarded as paliform lobes.

The costæ, or septo-costæ, as they may appropriately be called, are minutely granular, sub-equal in thickness, and prominent on the wall of the corallum. Those of the first and second orders unite at the base; just above this the secondaries are joined by the tertiaries, and the latter again by the quaternaries a little higher on the wall. The intercostal spaces are about equal in width to the costæ, and are crossed by a regular series of transverse bars, which separate longitudinal cavities in the wall. There is, however, no real penetration of this, as in the previously

* Microscopic and Systematic Study of Madreporarian Types of Corals. Phil. Trans., ser. B., vol. CLXXXVII. (1897), pp. 249 and 333.

† Op. cit., p. 296.

described species, the pore-like cavities only extending about halfway through the theca. In looking down upon the calice, the marginal portions of the uppermost row of intercostal bars can be seen as an outer wall just below the summit of the internal one. The bars themselves are solid, and form an integral part of the solid theca of the corallum. The structure of the wall is clearly indicated in a specimen from the Cape Otway section, which was fractured during fossilization (Pl. II., fig. 2*c*). The coral is not divided down the centre, but at the angle of two opposite primary septa ; and the slight projection on each side of the fractured surface represents the thecal connection between primary and adjoining quaternary cycles of costæ. Internally this is solid, but externally it consists merely of a series of thin transverse bars.

Height of corallum, 6 mm.; length of calice, 5·5 mm., breadth of calice, 4·2 mm. The specimens vary in size, and slightly also in proportionate measurements. The above dimensions refer to a large one selected as type for the calice. The corallum figured is 5·5 mm. high. An example from Adelaide, which is fractured similarly to the figured one from Cape Otway, is 5 mm. high.

Localities.—Abundant in the earlier Eocene of Adelaide bore, Cape Otway, and Wilkinson's Aire Coastal Section No. 4 (types). Rare in the later Eocene, west of Gellibrand River.

The species is named after Mr. A. E. Kitson, in recognition of his discovery of additional Tertiary outcrops in the vicinity of the Aire River.

Trematotrochus declivis, *spec. nov.* Pl. ii., fig. 3*a*, *b*.

The corallum is in outline an inverted short cone, with a steeply sloping surface. It is an elegant species, and by far the largest of the *Trematrochi*. The base is sub-acute, and the calice is wide, open, and slightly elliptical. The ratio of the diameters of the ellipse in the type is as 100 to 89, but in another and somewhat larger example this becomes 100 to 95.

Septa in six systems, with four cycles, all of which are regularly developed. The first two orders are stout and exsert, especially the primaries ; the tertiaries are much smaller, while the quaternaries are thin and comparatively inconspicuous laminæ. Some septa are occasionally notched near their central terminations, but this is not a regular feature of the calice.

The columella consists superficially of a thin, tortuous, rod-like structure, with occasional projections on its surface. Offshoots from it to some of the septa simulate pali, but from their irregular development I judge them to be merely portions of a fascicular columella. All the septa of the first and second orders are fused to the columella, either by these paliform offshoots or by solid processes just below its surface.

The costæ, which are continuations of the septa, are stout and prominent on the wall. The primaries and secondaries are equal, and a little thicker than the tertiaries and quaternaries, which are also equal. All gradually diminish in size towards the base of the corallum. The first three cycles unite at the base, and the tertiaries are joined by the quaternaries a little higher up. Each intercostal space is crossed by a regular series of transverse bars, with pore-like cavities between. In one specimen I counted 27 bars, with their corresponding cavities, between two adjacent costæ. As in the case of *T. Kitsoni*, these cavities do not penetrate the wall, which is continuous within the calycle. Similarly, also, the theca of this coral is stout, except where reduced in thickness by the series of cavities in the intercostal spaces.

Height of corallum, 7·5 mm.; length of calice, 8·6 mm.; breadth of calice, 7·8 mm. These are the dimensions of the type. A larger specimen obtained lately is 10 mm. high, and has an almost circular calice, its diameters being respectively 10 mm. and 9·5 mm.

Localities.—Rare in an outcrop of the older Eocene at the mouth of Brown's Creek (adjoining Joanna River), on the south coast of Victoria. Four specimens, of which one is less than half the size of the type.

This species, as well as the section in which it occurs, was discovered by Mr. Kitson in 1899.

Trematotrochus Mulderi, *spec. nov.* Pl. ii., figs. 4*a*, *b*.

Corallum small, free, very much compressed, and long in proportion to its breadth. Both the anterior and lateral surfaces slope gently to a flatly rounded base.

Calice subplane and elliptical, with its diameters in the ratio of 100 to 59.

Septa straight, free, and in six systems, with three complete cycles, of which the third is very thin, and projects but a short distance into the calice. The two principal orders are stout, especially the primaries, and unite with the columella by lobed and thickened ends.

The columella is large, prominent, and elongate, with a nodular surface. A transverse section of a corallum cut at about one-third from the base shows a solid interior without a trace of the septa or columella. In another example cut midway between the base and calice the interseptal loculi are still open. A third corallum cut longitudinally has the calycle solid almost to its summit, but the former outlines of the septa are faintly marked nearly to the base. Possibly the infilling of the visceral chambers in this species is due to a secondary deposition of carbonate of lime. As a fact, not only the corals, but other organisms from

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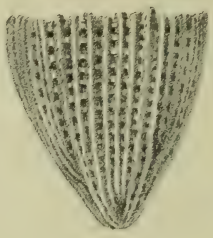

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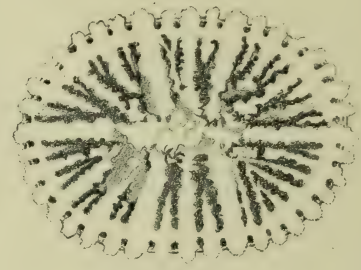

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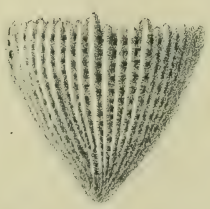

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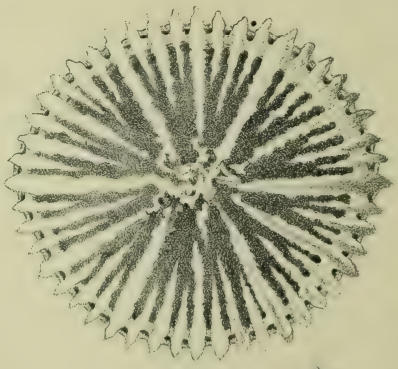

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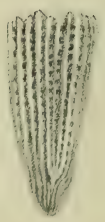

4a

4b

E. TRICKETT & J. DENNANT. DELT

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the same fossil bed—e.g., the mollusca—are much invested with concretionary calcareous matter. This peculiarity was commented upon by Messrs. Hall and Pritchard when describing the geological section.*

The costæ, which are minutely granular, are continuations of the septa, and vary in size according to their position on the corallum, and not according to their cyclical order. On the central portions of the anterior surfaces they are subequal and comparatively slender, and then gradually increase in thickness to the lateral primaries, which for such a small coral are very stout. At the actual margin of the calice the difference in the thickness of the costæ is inconsiderable, but the central ones rapidly diminish in size as they recede from the summit, while those at the ends become, if anything, a little stouter. In the four lateral systems all the costæ are free to the base, but in each central system, while the primaries remain free, the tertiaries fuse with the enclosed secondary low down on the wall. The intercostal spaces are narrower than the costæ, and are regularly fenestrated by a series of numerous transverse bars and intervening cavities, which, in this species, I regard as real pores penetrating the theca. I have decided this latter point on a single example, which was accidentally fractured for a short distance down an intercostal space. Four or five of the cross bars are left intact, and show a clear passage between each from the outside of the corallum to the interior. In other more perfect individuals this delicate characteristic is practically obscured by the calcareous coating previously referred to.

Average height of coralla, 6·2 mm.; a long one measures 8·2 mm. The calices are almost uniform in size. The diameters of the type are 3·2 mm. and 1·9 mm.

Locality. — Lower beds (Eocene) at Maude. Numerous examples.

I have great pleasure in naming this species after Mr. J. F. Mulder, my companion in many geological excursions.

EXPLANATION OF PLATE.

Plate II.

Fig.

1. Section of wall of *Trematotrochus fenestratus*, drawn under the microscope with transmitted light. Highly magnified.
2. *Trematotrochus Kitsoni*. *a*, corallum, 5 diam.; *b*, calice, 8 diam.; *c*, section of corallum showing structure of wall, 5 diam. (These three drawings represent different specimens.)
3. *Trematotrochus declivis*. *a*, corallum, 3 diam.; *b*, calice, 6 diam.
4. *Trematotrochus Mulderi*. *a*, corallum, 5 diam.; *b*, calice of another specimen, 10 diam.

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* The Older Tertiaries of Maude. Proc. Roy. Soc., Vic., 1894, p. 187.

Notes on the Extinct Volcanoes of Mount Gambier and Mount Schank, South Australia.

By Walter Howchin, F.G.S.

[Read June 4, 1901.]

It is somewhat remarkable that the interesting volcanic district, situated in the south-east of this State, has not been more thoroughly examined and described. No monograph, such as would do justice to the subject, has been attempted, and the strictly scientific literature, dealing with the extinct volcanic phenomena of the district, is very limited. The Rev. Julian E. Woods, in his work, "Geological Observations in South Australia" (1862), devotes three chapters to the subject. Mr. Wood's descriptions are vivid and painstaking, and have long been regarded as the main work on the subject. In 1884 Mr. H. Y. L. Brown, the Government Geologist of South Australia, published a brief report "On the Lakes in the Mount Gambier District," accompanied by geological sketch plans showing sections through the principal volcanic mounds, lakes, and deposits. If to these references we add a paragraph in Professor Ralph Tate's presidential address before the Philosophical Society of Adelaide in 1879, we have noted the principal sources of information that have been published on the subject. There can be little doubt if the country was exhaustively examined much new light would be thrown on the origin, character, duration, and other aspects of the volcanic activity.

The present notes are of slight pretensions. They do not aim at exhaustive treatment, but are the fruits of a few observations made during a recent brief visit to Mount Gambier and neighborhood.

Mount Gambier.

Mr. Woods advocates the view that the lineal chain of lakes at Mount Gambier represent a series of crater vents. He also believed that in the case of the Blue Lake and the Valley Lake subsidence preceded, and probably gave rise to volcanic vents in these positions, and that, in all, there were five craters in the Mount Gambier group.* Sections of the material forming the volcanic mound can be seen in many places,

* Op. cit., p. 250, et seq.

but they do not tend to sustain Mr. Woods' theory of multiple vents. The quaquaversal dip points to one centre of ejectment, whilst the depressed areas of the Blue Lake, the Leg of Mutton Lake, and the Valley Lake are undoubtedly sunken areas, the subsidence taking place late in the period of activity, or even after the volcano ceased to eject material.

This was the view taken by Mr. Brown, the Government Geologist, in the report already referred to, where he says: "From the contour of the Blue and Valley Lakes, and Lakes Edward and Leake, together with the appearances in their neighborhood, I think that they are not craters, but merely depressions caused by subsidence of the crust, consequent on the removal from below of such vast quantities of material as it is evident has been erupted."

A section, visible on the road which passes between the Blue Lake and the Leg of Mutton Lake, shows ejected material dipping away from the Blue Lake toward the Leg of Mutton Lake, looking as if it had formed part of a cone built up around the brink of the former. This I take to be a *false* dip, caused by the subsidence of the ground where the present Leg of Mutton Lake occurs, and thereby giving a tilt inwards of the beds around the subsided area.

The outline of the crater, proper, can be easily traced at the western extremity of the lakes, distinguished by the nearly circular outline of the walls and the quaquaversal dip of the cone. The southern segment is apparently almost intact, constituting the highest point of the Mount. The western and northern walls have suffered considerable erosion, whilst the eastern wall appears to have disappeared with the subsidence which gave rise to the Valley Lake. A small sheet of shallow water occupies the bottom of the crater, known as the "Crater Lake" or "Browne's Lake," and is alternately an independent sheet of water, or merges into the Valley Lake, as the water of the sunken areas mysteriously rises and falls.

The interior of the crater is marked by the presence of much stalactitic lava, which, when broken, has a pitchstone lustre. Some of it is evidently in situ, notably on the western side, where there is a most instructive face, about 30 ft. in height, that must have formed the true walls of the funnel. The consolidated igneous material can be seen in great folds, dripping sheets, and bulging bosses, separated by open spaces. The same kind of lava can be seen in situ near the bottom of the crater, as it passes under the lake which occupies the depression. Much stalactitic lava also occurs, mixed with the ash, at all elevations on the inner face of the vent. Some of these isolated fragments have been probably broken from the face of the funnel at lower levels, and hurled upward by force of the explosions.

There has been a considerable outflow of lava from the crater at an early stage of the eruption. This lava sheet, which is often very compact, and frequently contains crystals of olivine, can be seen in section both in the cliffs of the Valley Lake and the Blue Lake. Only a small amount of ash was ejected before this outflow, as is evident by the thin deposit that underlies it, varying from almost nothing up to 2 or 3 ft. in thickness.

The normal level of the ground before the eruption is indicated by the upper surface of the Eocene limestone, or a thin layer of sandy soil (presenting now a reddish color), which in places can be seen to rest upon this limestone, separating it from the ash or lava beds. The Eocene beds are not visible within the limits of the crater, but they take the form of mural cliffs in the lowest exposed positions surrounding the sunken areas of the Valley and Blue Lakes.

The main stream of lava appears to have flowed in the direction of the Blue Lake, as the thickest section (about 50 ft.) occurs in the vertical cliffs of this lake on the side nearest to the crater. When this fine section of lava is viewed from a boat on the water it is peculiarly striking and awe inspiring. The flow in this direction is somewhat irregular, and seems to have thinned out considerably on the eastern side of the lake. In places some instructive sections can be seen where the lava has ploughed up the ash and soil over which it has passed, throwing the layers into contortion and consolidating the material under igneous action. Good examples of these effects are visible by the side of the path which leads down from the pumping station to the boathouse.

Ejectamenta.—The structure of the volcanic cone is remarkably uniform. The stratification where visible is regular and unbroken, giving no evidence of rupture by igneous intrusions. On the outer slopes of the Mount the volcanic tufa has been reduced under atmospheric conditions to a fine dust, but within the crater the beds are somewhat indurated, probably from heat, which has enabled them the better to resist the disintegrating forces.

Evidences are abundant that the volcanic fires broke through solid beds of rock in reaching the surface. Large blocks of the local limestones, red and grey dolomite, fossiliferous Eocene, black flints, Tertiary sandstone, and angular fragments of lava are abundant, as well as volcanic bombs composed of lava or olivine. The dolomitic limestones are altered fossiliferous beds of Eocene age, and are found in situ overlying the latter in many parts of the district. The ejected fragments of dolomite are indistinguishable in their structure, color, and composition from the stones that are quarried at a

distance from the Mount, showing that the dolomitization of these beds had taken place before the period of volcanic activity. Many of the blocks of limestone contain layers of black flints in situ, and in mass measure up to 6 and 9 ft. in diameter. The flints, which became separated from their matrix before ejected, are frequently bleached and flaked by the heat to which they have been exposed.

The presence of large blocks of lava in the tufa is proof that the periods of activity were intermittent, for such consolidated lava must have been formed during periods of rest, when the magma may have cooled sufficiently to form a solid plug to the vent, only to be broken and ejected in angular masses when the volcanic forces broke out afresh. Some very large masses of limestone occur almost at the highest point of the cone, showing that the forces of ejectment were intense even in its later stages.

The finer material, comprehended under the general term of ash, is highly interesting. It may be said to consist of papilli, ash, and fine earthy material, the latter consisting largely of grains of sand. The presence of alluvial matter extensively mixed with the ash points to the conclusion that the eruptions were a mixture of mud and scoriaceous material. That this should be the case seems probable from the geological features of the district, and the indications that the volcanic foci were at shallow depth. The sedimentary rocks that are represented among the ejected material are almost entirely limited to those of Eocene age, which form the superficial geological features of the neighborhood. One or two small fragments of a siliceous quartzite were observed in the tufa that may have come from an older series below the Tertiary beds, but the almost total absence of such older rocks from the ejectamenta is suggestive.

The Eocene limestone is the great water-bearing stratum of the district. The depression of the Blue Lake and others, including the Crater Lake, are below this subterranean waterline; hence they contain water, which in the case of the Blue Lake has an average depth of 250 ft. The whole of this south-eastern country, at the level indicated, is saturated to an enormous extent. There is every reason to think that these hydrographic conditions existed at the time of volcanic activity, and may have acted as an important factor in creating the igneous outbreak. It would also give character to the eruption, and make the vents, more or less, mud volcanoes. There are, indeed, some evidences that a lake existed in or near the Mount Gambier crater before the original eruption, or during a period of quiet. Laminated mud, in irregular blocks, can occasionally be seen in the ejected material. One remark-

able example in my possession, obtained when the present road down to the bottom of the crater was being cut, shows a finely laminated sedimentary deposit, thickly covered on the faces of the laminæ with vegetable impressions. The deposit is evidently a recent one, and has become hardened, rendered fissile, and the vegetable matter carbonised by the heat. In addition to the sand, which makes up so large a proportion of the "ash" beds, there occur in some parts of the inner face of the cone a fair number of small waterworn quartz pebbles, ranging up to the size of a marble, which it is difficult to account for except on the supposition that they once formed part of a lake beach, or small shingle of a running stream, that occupied the site of the extinct volcano.*

Mount Schank.

This volcanic cone, which rises abruptly from the plain and forms a striking feature in the landscape, is about eight miles south of Mount Gambier. The Rev. Tenison Woods described Mount Schank as possessing two vents, an older and much wasted cone, and a newer vent, which had formed on the northern rim of the older crater, the newer vent constituting the main Mount of to-day. Mr. Woods has, I think, entirely misunderstood the features of the mountain in this respect. All the appearances indicate that the ejected material, which has built up the Mount, has come from the same vent. What Mr. Woods regarded as an older crater is a depression caused by the subsidence of the walls of the crater on its southern side. This appears to be the case from the following consideration:

(*a*) The fracture of the walls in the so-called "older crater" is perfectly sharp in outline, and the face has not been obscured in any way by showers of ash, which, on Tenison Woods' theory, must have been scattered over the base of the mountain, and more or less obliterated the outline of the older crater had it existed.

(*b*) The rim of the "older crater," instead of being quaquaversal in its dip, as viewed from its centre, is seen to make a symmetrical curve passing upwards to the summit of what is regarded, in Tenison Woods' theory, as the "newer vent," proving that the latter has been the source of the ejected material.

(*c*) The segment of the crater, where the subsidence has taken place, has a greater steepness than other portions in the external slope of the cone, and is concave in outline.

* It is possible that the sand and small shingle which are found among the ejected material may have had their origin from the breaking up of friable Tertiary sandstones within the limits of the vent.

(*d*) The rim of the crater on the side where the subsidence has taken place is broken in outline, and lower than the rest.

(*e*) The ash beds, which are distinctly stratified within the limits of the vent, are seen to be *faulted* as the result of the subsidence.

This fracture of the base of the mountain on one side has given a most instructive section of the beds for a thickness of some 60 or 70 ft. Very large blocks of fossiliferous Eocene limestone, as well as the grey and red dolomite, common in the tufaceous material of Mount Gambier, are seen protruding from the ash beds. One block of limestone measures fully 20 ft. in diameter. It might have been regarded as a natural outcrop had not the evidence been clear that it rests upon the ash, which has been disturbed by the force of its impact.

Ejected blocks of lava, whilst common at Mount Gambier, are rare in the cone of Mount Schank, and so far as I examined the ejected material there is less indication of mud and sand, the finer material of the cone being composed almost entirely of ash, papilli, and scoriæ.

The Lava Field.

One of the most interesting features of Mount Schank is the lava field, which occupies the comparatively level ground on its western side, and may be estimated as extending about one and a quarter miles laterally to the Mount and three-quarters of a mile wide. Tenison Woods, in his "Observations" (p. 274, et seq.), says: "It seems, for many reasons, very clear that this stream proceeded from the ancient crater, and not from the more modern one." The reasons given for this conclusion are purely of a theoretical character, and do not rest on inductive observations. In a later passage he says: "This line of lava was, then, a current from Mount Schank's ancient crater; but, in supposing it to be so, it is not easy to account for the broken undulatory character of the scoriæ." This extraordinary arrangement of the lava, which was a puzzle to Tenison Woods in applying his theory, supplies one of the most important lines of proof which accounts for its existence. The inapplicability of Woods' theory to the facts is seen in that the lava thins out as it approaches that side of the Mount from whence he supposed it to have originated, and we have already shown that what he considered an "older crater" is nothing more than a local subsidence of a similar kind as has occurred around the Mount Gambier crater.

A careful examination of the lava field reveals the interesting fact that it has not been the product of one great outflow of lava proceeding from a single vent, but rather a network of

fissures existed throughout the area, out of which the lava was obtruded in limited quantities. The field exhibits an ever-varying surface of rough ridges and bosses of lava, which rise from 12 to 20 ft. above the normal level. In a few instances a stream has flowed for a short distance, but, for the most part, the lava has formed as an excrescence over the fissure from which it exuded, and the feeble attempts at flow have been circumscribed by other lava ridges which existed in close proximity.

A very instructive example of the way in which these lava ridges and bosses have been formed can be seen in an isolated ridge, which evidently owes its existence to a fissure on the north-west side of the mountain, originating at the base of the cone, and extending for about a quarter of a mile in a direction at right angles to the Mount. The lava is in the form of a steep broken ridge, which reaches a maximum height of about 40 ft. There is no sign of a stream or lateral outflow, but the igneous material has penetrated the superincumbent ashbeds in the form of intrusive veins, and thrown the beds in places into a high angle of dip. In consequence of this displacement of the superficial beds of ash the latter supplied the lateral walls by which the igneous rock was confined, where it imperfectly broke through the surface. The fissure has apparently greatly varied in its size at different points of its length. This can be noted by the broken outline of the ridge, dying out almost to nothing at one spot, and at others in a high angle of outcrop, forming an igneous boss that looks like a great basaltic wall.

Where the road crosses this ridge, which it does in one of its gaps, some excavation has been carried out and revealed a most interesting section, showing the relationship of the lava to the older ash beds. Tongues of lava can be seen penetrating the ashbeds, distorting them, but do not reach the surface. Others, somewhat stronger, break through the superincumbent mass and reach the surface. The section now described forms the bank on the east side of the road. On the west side of the same cutting the ashbeds are practically undisturbed, but within a few yards they are raised at a high angle, and the lava of the ridge reaches its greatest altitude in the height already mentioned. The ridge is separated by a considerable distance from the main lava field; the intervening space is level, and occupied by ash or soil.

A question of considerable interest is involved in the relation which the lava deposits bear to the volcanic ash with respect to time. Did the lava eruptions precede the ejectment of ash which built up the cone around the central vent? Or did such eruptions occur concurrently with the showers of ash?

Or even after the volcano had lost the power to eject? It is a remarkable fact that whilst the lava field lies immediately under the shadow of the mountain it is almost entirely free from ash deposits. The absence of such deposits cannot be referred to erosive effects, as the area contains a great many deep depressions between the walls of lava, which, on such a theory, ought to have been the receptacles of the ash, but they do not contain it, supplying the inference that no great amount of ash could have been thrown out from the crater subsequent to the outbreak of the lava at its foot.

On the other hand, a section supplied in the walls of the little lake, which exists immediately at the base of the Mount on its western side, shows the ash deposits entirely superior in position to the lava flow. This small depression, for such it is, is at a lower level than the present bottom of the crater, which accounts for the fact that whilst the latter is dry, the small outside depression has water in it, having sunk below the water level of the district. Around the greater portion of this lake there are vertical walls of Eocene limestone, like those encircling the Valley Lake and the Blue Lake at Mount Gambier. A thin layer of the old surface soil can be noted as resting on the limestone rock, hardened and discolored by the proximity of the igneous sheet which immediately overlies it. The lava at this point is for the most part compact in texture, but on the western side of the depression it is more vesicular, and in stalactitic forms, probably indicating the line of fissure at which the igneous matter reached the surface. This is still further rendered probable in that no limestone is seen in situ at this particular spot, having presumably been disturbed and removed by the intrusive rock. As already stated, the ash beds in this section entirely overlie the lava flow, and if they exist in their natural position must demonstrate that this particular sheet of lava was fed from a fissure that probably existed *before* the tufaceous cone was built up. It is possible, however, that the ashbeds, now covering the lava sheet, may be the effect of a rearrangement of material. The site is at the base of the cone, which rises immediately above it at a high angle, and it is not improbable that the scour of the side may have brought down the loose material on to the lava floor, producing a secondary series of deposits. If this was the source of the ashbeds, such rearrangement of material must have taken place before the depression of the lake occurred.

The evidence supplied by the great north-west ridge, described above, is more definite. There we have the igneous rock penetrating and distorting the volcanic tufa, demonstrating the anterior age of the ash. The same thing is proved by this fissure originating some distance up the side of the volcanic cone, and on which the lava is dependent for support.

The order of events, determining the relationship between the tufaceous material and the lava eruptions, may be suggested as follows:

(*a*) A primordial lava flow, which originated near the present small lake, on the western base of the mountain, and flowed over the old land surface before any ash was ejected, and, therefore, before the volcanic cone of tufaceous material existed.

(*b*) The great north-west fissure, which had its origin after a considerable thickness of ash had accumulated, and the cone was approximately developed to its maximum height.

(*c*) The great western lava field had its chief period of activity subsequent to the formation of the tufaceous crater, and probably marks the closing stages of the volcanic energy. It is possible that this fracture of the crust, on the western side of the mountain, and the outflow of molten material may have supplied the vent which relieved the subterranean tension and permitted the extinction of its fires. That the volcanic energy was in a state of decadence is seen from the absence of any one great stream of lava. The lava had little force behind it, and did little more than scar the surfaces of the fissures by which it found an exit.

Descriptions of New Genera and Species of Australian Lepidoptera.

By Oswald B. Lower, F.E.S., Lond., &c.

[Read October 1, 1901.]

BOMBYCINA.

Oiketicus erionota, n. sp.

Male, 30 mm. Head, thorax, abdomen, and legs whitish, densely clothed, face black, collar orange, anterior tibiæ, and tarsi blackish, middle and posterior pair ochreous. Antennæ black. Forewings elongate, moderate, costa faintly sinuate, termen gently bowed, oblique; light greyish fuscous, darker along costa and towards base; cilia grey-whitish. Hindwings with termen rounded; colour and cilia as in forewings. Underside of both wings with costa darker than above.

This species is remarkable for the densely haired abdomen and thorax, above and below.

Broken Hill, New South Wales; one specimen, at light, in May.

Zeuzera coscinopa, n. sp.

Male, 34 mm. Head, palpi, thorax, legs, and abdomen ashy-grey-whitish, thorax darker in middle. Antennæ dull ochreous, pectinations at greatest length 4. Forewings elongate, moderate, costa nearly straight, termen gently rounded, very oblique; dull whitish, evenly reticulated throughout, with fine black strigulæ; median third of wing becoming dark fuscous from base of costa to termen below apex, darkest on anterior half; cilia fuscous—whitish, strongly mixed with blackish. Hindwings with termen gently rounded; whitish, semi-hyaline, more or less finely reticulated with blackish strigulæ, more pronounced at apex and along inner margin; cilia as in forewings.

Nearest *neuroxantha*, Lower; but easily distinguished from that species by the absence of yellow veins and darker colouring.

Roeburne, Western Australia; one specimen. (Type in *Coll. Lyell*).

GEOMETRINA.

MONOCTENIADÆ.

EPIDESMIA OPHIOSEMA, n. sp.

Female, 30 mm. Head, palpi, antennæ, legs, and thorax grey-whitish, palpi 2½, blackish beneath and on sides, thorax with two longitudinal lateral black stripes. Abdomen greyish. Forewings elongate, triangular, costa nearly straight, faintly sinuate beyond middle, termen nearly straight, hardly oblique; grey-whitish, with well-defined black markings; costa narrowly dark fuscous from base to very near apex, attenuated anteriorly; a moderate, somewhat semi-ovate spot in middle of wing, nearer to costa than inner margin; a very thick streak from immediately before base, continued along inner margin to anal angle, thence continued parallel along termen to very near apex, with a very large deep sinuation below semi-ovate spot, and deeply sinuate posteriorly above inner margin, causing it to appear somewhat triangular above anal angle, and leaving a streak of ground color on inner margin throughout; an obscure fuscous line along termen; cilia greyish. Hindwings with termen nearly straight, apex somewhat prominent; light fuscous; a dark fuscous discal dot; cilia as in forewings.

Not very near any other, but very distinct by the thick black markings.

Perth, Western Australia; two specimens received from Mr. S. Angel, and taken in November.

SELIDOSEMIDÆ.

AMELORA HETEROPA, n. sp.

Male and female, 30 mm. Head, palpi, thorax, and antennæ reddish fuscous, in female grey-whitish, antennal pectinations 4, face with a moderate conical projection. Legs and abdomen greyish. Forewings elongate, triangular, costa slightly arched at base, thence straight; termen obliquely rounded; reddish fuscous, sprinkled with fine black scales, sometimes grey-whitish in female; a curved transverse series of 3 reddish spots at one-fourth; a large reddish discal spot; a waved transverse line of reddish spots, edged posteriorly in reddish specimens, with a fine line of greyish, from five-sixths costa to just before anal angle, moderately dentate at and above middle; cilia reddish fuscous, sometimes grey-whitish. Hindwings with termen faintly waved; greyish fuscous, lighter towards base, an obscure fuscous discal spot; a curved sub-median series of fuscous dots, more pronounced on underside; cilia grey-whitish.

Allied to the following species, but differs by the absence of the median band; the grey-whitish female is an abnormal looking variety, but is unquestionably referable to this species.

Broken Hill, New South Wales; three specimens (at light), during April and May.

AMELORA PLATYDESMA, n. sp.

Male and Female, 28–30 mm. Head, thorax, palpi, and abdomen silvery-grey, in female fuscous tinged, antennal pectinations 4, face with moderate horny projection, abdomen ochreous tinged. Legs greyish. Forewings shaped as in "*heteropa*;" silvery grey, irrorated with a few scattered fuscous scales; a broad dull reddish transverse median fascia, constricted on lower half, and edged obscurely with blackish, anterior edge strongly sinuate inwards, from costa at one-fourth to inner margin at one-fourth; posterior edge irregularly dentate throughout, projections more pronounced on upper half, from costa at five-sixths to immediately before anal angle; a large blackish discal spot; some blackish scales along termen, hardly forming definite markings; cilia silvery-whitish. Hindwings with termen faintly waved; grey-whitish, darker in female, but becoming lighter towards base in both sexes; an obscure transverse submedian series of moderate fuscous dots, more pronounced on underside, obscure in female; a faint fuscous discal dot; cilia as in forewings.

This may prove to be a variety of the above, as the markings approach very closely in both species. Should it be the case the present species is well worth a name, as it is such a distinct looking insect.

Broken Hill, New South Wales; two specimens taken at light in April. I have seen a specimen from Birchip, Victoria, taken in May.

CHLENIAS HETEROMORPHA, n. sp.

Male and female, 27-32 mm. Head, palpi, and thorax cinereous-grey, face with a median horny projecting plate, entire, apex acute. Antennæ ochreous, pectinations 4. Abdomen ochreous. Legs cinereous-whitish, posterior pair blackish. Forewings very elongate, triangular, somewhat narrower in female, termen obliquely rounded; fuscous, mixed with dark fuscous and whitish, so as to appear ashy-grey-whitish, lighter in female and mixed with ochreous and whitish; base ochreous in both sexes; veins irregularly outlined with blackish; a short oblique blackish streak from costa near base; a second, indicating first line, just beyond and parallel; costal space between whitish; second line similar to first, from one-third of costa;

subterminal dentate, blackish, scarcely perceptible, from costa at five-sixths to just before anal angle; a suffused fuscous spot above anal angle; veins towards termen shortly outlined with black, less pronounced in female; a fine black line along termen; cilia cinereous-grey. Hindwings with termen rounded; faintly sinuate below apex; whitish grey, somewhat darker along termen; a fuscous line along termen; cilia whitish.

Closely allied to *arietaria*, Gn., but differs by the much narrower forewings, which are not half as wide as forewings, the different shaped horny projection of head, which in *arietaria* is emarginate, and especially by the much shorter antennal pectinations.

Broken Hill, New South Wales; several specimens, mostly at light, in April. I have seen a specimen from Birchip, Victoria.

GEOMETRIDÆ.

EUCHLORIS TETRASPILA, n. sp.

Male, 24 mm. Head and thorax green, face green, fillet white. Antennæ and palpi ochreous-white. Abdomen greenish, whitish on sides and beneath. Legs ochreous, anterior pair light crimson. Forewings elongate—triangular; costa moderately arched, termen nearly straight, oblique; bright green; costal edge light crimson throughout, becoming darker and broader towards base, especially beneath; first line absent; a dark ferruginous discal spot; second line formed by an oblique transverse series of small white dots, from beneath costa at three-fourths to inner margin before two-thirds; cilia green, terminal half pale fleshy pink. Hindwings with termen angulated on vein 4; 3 and 4 short stalked; color, discal dot and second line as in forewings; cilia as in forewings.

Nearest *cadmaria*, Gn., but differs especially by the colour of palpi, antennæ and cilia, which in that species are crimson.

Kelso, Tasmania; one specimen in March. (Type in *Coll. Lyell.*)

EMMILTIS COSMADELPHA, n. sp.

Male and female, 14-18 mm. Head, palpi, antennæ, and thorax whitish, face ochreous. Abdomen ochreous. Legs whitish, anterior pair fuscous. Forewings elongate-triangular, termen gently bowed; whitish, faintly ochreous-tinged; a fuscous basal patch, outer edge faintly curved, bounded by a fine fuscous line, from one-fourth costa to one-fourth inner margin; a fine waved transverse line from costa before two-thirds to middle of inner margin, followed by a broad parallel light fuscous fascia, posterior edge

irregularly waved, and nearly reaching termen, and only separated from it by a moderate streak of ground color; cilia light fuscous. Hindwings pale yellow; cilia grey.

Allied to *trissodesma*, Lower, but immediately separable by the different colored hindwings, especially the female, which in that species are fuscous.

Broken Hill, New South Wales; two specimens in September (at light).

PYRALIDINA.

SCOPARIA ANISOPHRAGMA, n. sp.

Male, 16 mm.; female, 20 mm. Head, palpi, and thorax cinereous-grey, patagia white, palpi beneath blackish. Antennæ and legs blackish, irrorated with whitish, posterior legs greyish, tibia suffusedly banded with blackish. Abdomen greyish-fuscous, anterior segment dull ochreous. Forewings elongate triangular, costa almost straight, termen oblique, hardly bowed; cinereous-grey; markings reddish-ferruginous; a moderately broad fascia from one-fourth costa to one-fourth inner margin, with a strong projection outwards in middle; a similar fascia from five-sixths to two-thirds of inner margin, indented beneath costa and strongly curved inwards in middle, angles rounded; a short oblique dash just before apex; a blackish patch above anal angle; some blackish scales before termen; cilia grey, becoming cinereous at base, with a fuscous subterminal line. Hindwings with termen faintly sinuate below apex; grey on basal half, becoming broadly light fuscous along termen; cilia grey with a fuscous basal line.

Allied to the following, but very distinct by the transverse fasciæ and clearness of markings.

Broken Hill, New South Wales; two specimens in August.

ECLIPSIODES CRYPSERYTHRA, n. sp.

Male, 20 mm. Head, palpi and thorax grey-whitish, somewhat mixed with reddish, palpi beneath white. Antennæ fuscous, spotted with white, abdomen greyish-ochreous, second segment orange-red. Legs whitish, tarsi irregularly banded and fuscous. Forewings shaped as in *anisophragma*; grey-whitish, more or less suffusedly irrorated with fuscous and with some reddish scales; markings fuscous, obscurely defined; a small spot at base; a narrow, slightly oblique fascia, from one-quarter costa to beyond one-quarter of inner margin; ground color between base and fascia tinged with reddish; a similar fascia from costa at five-sixths to inner margin at two-thirds, slightly dentate and with a rounded projection above middle;

a short oblique dash just before apex; a moderate, straight, longitudinal dull ochreous or reddish streak above middle, from base direct to projection of second fascia, attenuated anteriorly and dilated posteriorly; a similar streak along fold; veins towards termen outlined in similar color; a moderately clear streak of ground color before termen; a few blackish scales along termen; cilia greyish, with a well-defined row of black spots at base and a fuscous subterminal line. Hindwings with termen rounded, faintly sinuate below apex; very pale ochreous, becoming broadly light fuscous around termen, but leaving a moderate streak of ground color along termen; cilia light greyish-ochreous, with a fuscous basal line.

Allied to the preceding but easily distinguished by the longitudinal streak, spotted cilia of forewings, palpi being white beneath and the pale ochreous hindwings. The streak of ground color before termen on both wings is a curious character; this and the spotted cilia of forewings are better discerned beneath.

Broken Hill, New South Wales; nine specimens in July and August.

EROMENE OCELLEA, Haw.

I have recently captured specimens of this European species at Broken Hill, New South Wales, in August, and have also received specimens from Roeburne, Western Australia. Some years ago I gave the late Mr. E. Guest, of Balhannah, South Australia, a specimen of what I believe was this species, and later Mr. Meyrick stated that he received a specimen from that gentleman, who took it at Mount Lofty, S.A. However, there can be no doubt about the present specimens, and it can now be added to the Australian fauna.

TORTRICINA.

LOMASCHIZA, n. g.

Thorax with dense bifid posterior crest. Antennæ of male serrate, very shortly ciliated at joints. Palpi very short, porrected, second joint triangularly scaled, terminal joint nearly concealed. Forewings elongate, moderate, costa of male with a swollen membranous ridge beyond middle; termen obliquely rounded; 7, 8, and 9 closely approximated at base, 7 to termen, 2 from lower angle of cell, remote from 3; 3 and 4 closely approximated at base, 10 and 11 strongly curved, 11 running along lower edge of ridge. Hindwings broader than forewings, costa strongly arched in middle, termen in male strongly emarginate below apex (causing apex to appear very prominent), and indented on vein 1; 6 and 7 somewhat approximated at base, 3 and 4 from a point, 5 approximated to 4

at base; in the female the wing is normal, *i.e.*, with the termen rounded.

A remarkable genus, not near any other known to me. The curious ridge on costa of male and aborted hindwings make it a conspicuous genus.

LOMASCHIZA PHYSOPHORA, n. sp.

Male and female, 10-14. Head, thorax, antennæ, and abdomen ochreous-fuscous. Palpi whitish, beneath fuscous. Face whitish. Legs fuscous, anterior coxæ dark fuscous. Forewings elongate, moderate, costa faintly sinuate in middle, termen obliquely rounded; ochreous-fuscous; 3 leaden-metallic spots on inner margin, first at one-sixth from base reaching half across wing, preceded by a waved narrow oblique dark fuscous line from costa near base to inner margin at one-sixth; second before middle, somewhat triangular, reaching more than half across wing, anterior edge dentate, dentation filled with blackish and preceded by an oblique clear whitish line; a similar line along posterior edge of spot; third small, erect, elongate, just before anal angle; a sharply defined oblique black streak from costa beyond middle to middle of wing, posteriorly edged with leaden-metallic, becoming sinuate outwards at termination, sinuation filled in with black, sometimes continued as a fine whitish line to anterior edge of third leaden spot; ground color between streak and triangular spot on inner margin more ochreous; a very large space of light fuscous between sinuation and termen, encircled by a whitish-ochreous ring, which almost touches a similar blackish centred very small ring just below apex; 7 pairs of whitish costal strigulæ, first two pairs just above triangular patch; cilia ochreous-fuscous. Hindwings with termen in male strongly sinuate in middle, in female rounded; grey-whitish, very thinly scaled in male, dark fuscous in female.

Cooktown, Queensland; three specimens in June. I have seen a specimen from Mackay.

PYRGOTIS (?) CALLIZYGA, n. sp.

Female. 20 mm. Head, thorax, antennæ, and abdomen dark fuscous, patagia ochreous-yellowish. Palpi ochreous-fuscous. Legs ochreous. Forewings elongate-triangular, costa rather strongly arched, termen obliquely rounded, sinuate beneath apex, hardly produced; ochreous-yellow, with dark fuscous markings; a broad basal fascia, continued along inner margin to median fascia, with a projection above inner margin at one-fourth, leaving a spot of ground color at base; median fascia moderately broad, oblique, somewhat dilated on costa, from costa in middle to posterior extremity

of streak along inner margin; a moderate triangular spot on costa at three-quarters; an erect fascia from anal angle reaching two-thirds across wing, apex irregular; a fuscous blotch just above inner margin, connecting median and last-mentioned fasciæ; an elongate fuscous spot on upper half of termen, more or less continued to apex; cilia yellowish, on upper half fuscous with whitish tooth at apex. Hindwings with termen rounded, faintly sinuate beneath apex; 3 and 4 remote, 5 very widely remote, midway between 4 and 6; dark bronzy-fuscous, faintly spotted with darker; cilia light fuscous, with a darker basal line. Underside of hindwings yellowish, spotted with fuscous.

Doubtfully referable to *Pyrgotis*; it approaches *Acropolitis* somewhat, but appears distinct from either of these genera by the curious neuration of hindwings. I would have formed a new genus for its reception, but in the absence of the male it seems wiser to defer doing so for the present.

Mount Gambier, South Australia; one specimen in November.

SYNTOZYGA, n. g.

Thorax with a small posterior crest. Antennæ in male strongly biserrate, shortly ciliated. Palpi moderate, somewhat arched, thickened with appressed scales, terminal joint short, exposed, about one-third of second. Forewings elongate, moderate, slightly narrower than hindwings, surface somewhat roughened; costa simple, nearly straight, termen obliquely rounded, secondary cell very small, distinct, all veins separate, 7 to termen, vein 1 furcate at base, 3 from angle, remote from 4, 6 and 7 widely remote. Hindwings with 3 and 4 somewhat connate, 5 curved, remote from 4, 6 and 7 long stalked.

Somewhat allied to *Palaeotoma*, but differs by the crested thorax, biserrate antennæ, short terminal joint of palpi, separation of veins 7 and 8 of forewings and well marked secondary cell. This latter character is not of much value.

SYNTOZYGA PSAMMETALLA, n. sp.

Male, 10 mm. Head, palpi, thorax, legs, and antennæ ochreous, second joint of palpi very short. Abdomen greyish-ochreous. Forewings elongate, moderate, costa nearly straight, termen obliquely rounded; ochreous, finely and transversely strigulated with ferruginous; costa shortly and obliquely strigulated with ferruginous; outer edge of basal patch limited by a narrow ferruginous fascia, from one-third costa to one-fourth inner margin, angulated outward in middle; median patch moderately broad, nearly straight, from middle

of costa to beyond middle of inner margin, edges obscurely defined; some leaden-metallic scales between fascia and patch; some similar scales in posterior edge of fascia near costa, and more or less continued to inner margin before anal angle, where it becomes blotch-like and edged posteriorly with ferruginous; an irregularly curved ferruginous streak, from costa just beyond posterior edge of median patch to below middle of termen, dilated in middle; a small triangular ferruginous spot at apex, with a darker spot at its lower extremity; cilia ochreous, base darker. Hindwings with the termen rounded, faintly sinuate beneath apex; greyish; cilia as in forewings.

Cooktown, Queensland; two specimens in January.

Polylopha, n. g.

Thorax smooth. Antennæ in male somewhat dentate, thickened, very shortly ciliated. Palpi moderate, straight, porrected, second joint triangularly scaled, terminal joint exposed, short. Forewings elongate, moderate, rather narrow, surface with raised tufts of scales, costa simple, arched at base, termen oblique, nearly straight; 2 from beyond two-thirds, 3 and 4 from angle, closely approximated, 7 and 8 separate, 7 to costa. Hindwings broader than forewings, termen faintly sinuate beneath apex; 3 and 4 from a point, 6 and 7 separate.

Differs from *Palaeotoma*, to which genus it is not very near, by the separation of veins 6 and 7 of hindwings and vein 7 of forewings running to costa.

Polylopha epidesma, n. sp.

Male. 16 mm. Head, palpi, and thorax cinerous-grey, second joint of palpi beneath white, with some black spots at apex. Antennæ fuscous. Legs whitish, anterior tarsi banded with blackish. Abdomen greyish-fuscous. Forewings moderate, costa arched at base, thence nearly straight, termen faintly sinuate beneath apex, oblique, nearly straight; ashy-grey-whitish, mixed with greenish-leaden, and strewn with numerous tufts of ashy-grey-scales, which become blackish posteriorly; a short oblique blackish streak at base, not reaching costa; an oblique fuscous streak from costa at one-fourth, reaching fold; a tuft of scales immediately between; a suffused fuscous spot on costa, indicating commencement of second fascia; a narrow longitudinal black line along fold, from base to termen above anal angle, becoming dot-like on anterior half; a broad suffused black transverse fascia, from costa at three-fourths to extremity of longitudinal streak, becoming dilated on lower half, sometimes obsolete on upper half; 4 or 5 blackish dots on costa between anterior extremity of last fascia and apex; some fine black scales on middle of

termen; cilia ashy-grey-whitish, with some blackish scales at base. Hindwings with termen rounded; sinuate beneath apex, apex prominent; dark fuscous, lighter on basal half; cilia dark fuscous, with a fuscous subterminal line, basal line greyish.

The black longitudinal streak recalls *Palaeotoma styphelena*, Meyr.

Mackay, Queensland; two specimens in April.

Temnolopha, n. g.

Thorax with dense posterior bifid crest. Antennæ in male somewhat serrate, shortly ciliated. Palpi rather long, porrected, second joint triangularly scaled, terminal joint short, distinct. Posterior tibiæ thickened in male. Forewings elongate, moderate, costa simple in male, gently and evenly arched, termen nearly straight. Hindwings broader than forewings. Forewings with secondary cell distinct, 7 and 8 separate, 7 to termen, 3 and 4 remote at base, 3 somewhat curved. Hindwings with 3 and 4 from a point, 5 approximated to 4 at base, 6 and 7 separate.

Somewhat allied to *Arotrophora*, Meyr., but differs essentially by the crested thorax, absence of costal fold and shorter ciliations of antennæ.

Temnolopha mosaica, n. sp.

Male and female, 15-22 mm. Head, palpi, and thorax ochreous-grey, mixed with reddish, thorax with a dense reddish bifid posterior crest, palpi beneath whitish. Antennæ and abdomen fuscous-grey, beneath whitish. Legs whitish, tarsi suffusedly banded with blackish. Forewings elongate, moderate, costa gently arched, termen hardly oblique, nearly straight; dull olive-greenish, sometimes strongly mixed with ferruginous, except beneath costa; costa shortly and obliquely strigulated with ferruginous and whitish; outer edge of basal patch represented on lower half by an irregular oblique wedge-shaped dark ferruginous patch, apex reaching to one-quarter in middle on inner marginal edge is a tuft of somewhat raised scales; a broad fuscous-greenish post-median fascia, not near reaching costa, anterior edge from beyond middle, with a rounded projection on upper angle, thence deeply sinuate and irregularly continued round to anal angle, where it touches a small erect fuscous patch, which indicates posterior extremity of fascia; a greenish-fuscous somewhat lunate mark just above the erect patch, faintly edged above with whitish; ground color between this and anal angle fleshy white; a small blackish spot at apex; a few black scales along termen; cilia olive-greenish mixed with fuscous, becoming grey-whitish around

anal angle. Hindwings dark fuscous, somewhat bronzy; cilia fuscous, with a darker subbasal line.

Mackay, Cooktown, and Townsville, Queensland; three specimens in January and February.

Temnolopha metallota, n. sp.

Male, 18 mm. Head, palpi, and thorax purplish, thorax with a dense reddish-fuscous posterior crest. Antennæ ochreous. Legs greyish. Forewings elongate, moderate, costa gently arched, termen obliquely rounded, veins 7, 8, 9 are closely approximated at base, 8 and 9 are almost from a point from angle, in *mosaica* 9 is from well beyond the angle; dull bluish-purple; costa obiquely strigulated with fine short fuscous and white strigulæ; a fine fuscous line from costa at one-third to inner margin at one-third, evenly curved outwardly on upper three-fourths, and with an indentation just above inner margin, ground color between this and base finely and transversely strigulated with waved fuscous lines; an irregular transverse ferruginous patch, from costa beyond middle to inner margin beyond middle, much narrowed on lower half, containing a few blackish scales just above inner margin; two moderate irregular transverse ferruginous fasciæ, first from five-sixth costa to anal angle, containing two short fine longitudinal black streaks above anal angle; second from apex to middle of termen, leaving one or two whitish teeth on termen; a fine fuscous line along upper half of termen; cilia fuscous, on lower half grey-whitish, separation distinct. Hindwings with termen rounded, faintly sinuate beneath apex; ochreous-fuscous; cilia greyish, with a fuscous line near base.

At first sight not unlike *Carpocapsa pomonella*. Lin.

Cooktown, Queensland; two specimens in June.

Sorolopha, n. g.

Thorax with a dense posterior crest, not bifid. Antennæ serrate, very shortly ciliated. Palpi short recurved, oppressed to face, terminal joint very short, nearly concealed. Abdomen in male densely haired, and with a moderately erect tuft of hairs on anterior segment, tibiæ in male broadly dilated, coxæ with an expansible tuft of hairs at base. Forewings and hindwings with neuration as in *Temnolopha*; termen obliquely rounded.

Differs from *Temnolopha* only by the crest on anterior segment of abdomen, different palpi, ciliations of antennæ, which are hardly perceptible, different crest of thorax and especially by the large tuft of hairs on posterior legs. It at first considered these characters specific only, but it seems desirable on reconsideration to form a new genus for the reception of the following species.

Sorolopha cyclotoma, n. sp.

Male and female, 17-22 mm. Head, palpi, antennæ, and thorax deep reddish-fuscous, thorax with a dense deep reddish posterior crest. Abdomen deep ochreous-fuscous, in male densely haired with golden ochreous, especially on anterior segments. Forewings elongate, moderate, costa gently arched, termen rounded, oblique; deep olive-greenish mixed with fleshy-pink; costa shortly strigulated throughout with fuscous; outer edge of basal patch represented by an erect triangular blackish patch on inner margin at one-fourth, reaching two-thirds across wing, edged posteriorly by a fine line of fleshy-white; ground color between apex of patch and costa fleshy-pink; posterior edge of median patch well defined, edged throughout by a fine fleshy-white line, from costa beyond middle direct to anal angle, faintly sinuate above middle; ground color between this and triangular patch deep olive-green, becoming broadly mixed with flesh color above inner margin; ground color between posterior edge of median patch and apex fleshy pink, mixed with purplish and containing a large round fuscous reddish patch above middle, lower edge suffused; a deep purplish line along upper half of termen, becoming forked at apex; cilia fuscous purple, mixed with fuscous on upper two-thirds. Hindwings with termen rounded, dark golden-ochreous, lighter towards base; cilia ochreous-fuscous, with a darker subbasal line. The ochreous coloring of hindwings is more pronounced beneath.

Mackay, Queensland; four specimens in January.

Capua leptospila, n. sp.

Male, 18 mm. Head and palpi whitish, palpi beneath infuscated. Abdomen greyish. Antennæ and thorax fuscous, antennæ obscurely spotted with whitish. Legs fuscous, middle and posterior pair whitish-ochreous. Forewings elongate, moderate, costa nearly straight, termen oblique, gently rounded; whitish-ochreous, spotted throughout with fuscous; markings dark fuscous; costa shortly strigulated throughout with fuscous; outer edge of basal patch from one-fifth costa to one-eighth inner margin, upper half oblique, with a fine projection on fold, thence inwardly oblique and rapidly attenuated to inner margin; an elongate quadrate spot lying on inner margin at one-fourth; median fascia oblique, from before middle of costa to anal angle, becoming much dilated on inner margin, anterior edge nearly straight, with a moderate sinuation below fold; posterior edge with a moderate sinuation about middle, thence irregular; an elongate streak from posterior extremity of median patch to above middle of termen, leaving a strip of ground color along termen; a moderate trian-

gular patch on costa at three-fourths, containing two pairs of short white strigulæ, and 3 darker fuscous equidistant dots on costa; a spot at apex; cilia greyish, barred with fuscous on basal half. Hindwings with termen rounded; greyish, spotted with fuscous, so as to appear greyish-fuscous; a fine fuscous line along upper half of termen; cilia greyish, with a darker basal line.

Distinct and clearly marked; perhaps nearest *Sordidatana*, Meyr.

Broken Hill, New South Wales; one specimen in May

Capua pentazona, n. sp.

Female, 16 mm. Head, palpi, antennæ, and thorax dark fuscous, palpi beneath white, sharply defined, antennæ obscurely annulated with whitish, thorax with a whitish spot on posterior extremity, patagia whitish. Legs whitish, all tarsi black, ringed with whitish. Forewings elongate, triangular, costa moderately arched, termen oblique, rounded beneath; dark fuscous, more or less sprinkled with whitish; five transverse black fasciæ, all finely inorated with greenish white; first, indicating edge of basal fascia, from one-sixth costa to one-fourth inner margin, gently curved outwards; second slightly curved outwards beneath costa, from costa at one-fourth to before middle of inner margin; ground color between first and second fasciæ strongly irrorated with whitish; third nearly straight, from just before middle of costa to before middle of inner margin; fourth parallel, just beyond; fifth parallel, from costa at three-fourths to anal angle; the last two fasciæ are interrupted by a well-defined broad oblique whitish fascia, from immediately beyond third fascia to anal angle, cutting fourth fascia in middle; three oblique whitish spots on costa between posterior edge of white fascia and apex; a black streak, strongly irrorated with whitish along termen; cilia fuscous, mixed with blackish. Hindwings with termen rounded, faintly sinuate beneath apex; fuscous, spotted with darker fuscous; cilia greyish, with a fuscous subbasal line.

Nearest *decolorana*, Walk, but immediately distinguished by the fuscous hindwings. The description of *Asthenoptycha conjunctana*, Walk., would seemingly indicate an insect of similar appearance, but the palpi of this species would alone remove it from that genus.

Capua panxantha, n. sp.

Female, 16-20 mm. Head, palpi, antennæ, thorax, and abdomen yellow-ochreous. Legs somewhat paler. Forewings elongate, moderate, costa strongly arched, termen gently bowed, oblique, faintly sinuate beneath apex; yellowish-

ochreous, finely strigulated throughout with darker ochreous mostly arranged in transverse series; outer edge of basal patch hardly perceptible, except on margins; median patch narrow, oblique; dull ferruginous, from costa before middle to just before anal angle; an obscure oblique dull ferruginous fascia from costa at five-sixths to middle of termen; cilia pale ochreous. Hindwings with termen rounded; 5 remote from 4; ochreous-yellow; cilia as in forewings.

Allied to *melichroa*, Lower; but apart from its much smaller size, it may be at once distinguished by the ochreous hindwings.

Cooktown, Queensland; several specimens in November.

DICHELOPA, n. g.

Thorax smooth. Antennæ in male thickened, somewhat dentate; shortly ciliated. Palpi moderate, porrected, second joint triangularly scaled, terminal joint hardy concealed. Forewings elongate-oblong, costa in male simple, gently and evenly arched, termen rounded oblique, 1 furcate at base, 3 and 4 short stalked, 7 and 8 stalked, 7 to immediately above apex. Hindwings with 7 veins, termen faintly sinuate beneath apex; 4 absent, coincided with 3, 3 rather approximated to 5, 6 and 7 tolerably remote at origin.

Not near any other Australian genus known to me, the neuration of forewings, and absence of vein 4 of hindwings are distinctive characters; a similar character occurs in the European genus *Cheimatophila*, Stph. Its resemblance to *Dichelia* is superficial only.

DICHELOPA DICHROA, n. sp.

Male and female, 14-16 mm. Head, palpi, antennæ and thorax ochreous-ferruginous. Abdomen dark fuscous, beneath ochreous. Anterior and middle legs ochreous-fuscous, posterior pair ochreous, tarsi with fuscous rings. Forewings elongate, moderate, costa gently arched, termen oblique, rounded; deep ochreous, with irregular transverse rows of leaden-metallic spots; markings reddish-fuscous; a basal patch, strongly suffused with ground color at base and on inner margin, outer edge from costa at one-fifth to inner margin at one-fourth, with a slight projection in middle; a broad streak along costa, from just beyond one-third to three-fourths of wing, thence becoming confluent with a large apical patch, ending on termen at three-fourths, enclosing on costal edge 4 well defined spots of ground color, anterior large, posterior 3 close together near apex; a large spot on inner margin at anal angle, reaching half across wing, separated from costal streak by a streak of ground color; a row of about 6 suffused ochreous spots along termen, posteriorly edged by minute leaden-metallic

spots; cilia ochreous, becoming fuscous around anal angle. Hindwings with termen rounded; dark fuscous; cilia fuscous; with a darker fuscous subbasal line.

Goolwa and Port Victor, South Australia; six specimens in November.

BYRSOPTERA, n. g.

Thorax with a very small posterior bifid crest. Antennæ in male serrate, shortly ciliated. Palpi short, porrected; second joint triangularly rough scaled, terminal joint almost concealed. Forewings moderate, elongate, costa in male simple, hardly arched, termen obliquely rounded; 7 and 8 separate, 7 to termen, secondary cell distinct, vein 10 strongly curved in middle. Hindwings slightly broader than forewings, costa very strongly arched in middle, termen faintly sinuate; 3 and 4 from a point, 5 widely remote, parallel to 4, 6 and 7 separate.

In the neighborhood of *Dipterina*, but the antennæ and separation of veins 6 and 7 of hindwings are distinct from that genus.

BYRSOPTERA XYLISTIS, n.sp.

Male and female, 8-10 mm. Head whitish-ochreous, thorax, palpi, and antennæ light fuscous. Abdomen dark fuscous. Legs fuscous-whitish. Forewings moderate, costa hardly arched, termen obliquely rounded; light fuscous, finely irrorated with darker fuscous; costa shortly strigulated with fuscous; 3 moderately oblique fuscous fasciæ, first close to base, not reaching inner margin; second at one-fourth of costa to one-fourth of inner margin, continued to inner margin below middle as a fine line; third entire, from middle of costa to beyond middle of inner margin, with a strong projection outwards in middle; an erect fuscous triangular spot on inner margin at anal angle, indicating posterior extremity of a fourth fascia; a short oblique fuscous spot at anal angle; a small fuscous subapical spot; a fine fuscous line along upper half of termen; cilia greyish-fuscous, at base ochreous fuscous. Hindwings with costa strongly arched in middle; pale greyish, thinly scaled; cilia light fuscous.

A neatly marked insect and easily recognised.

Cooktown, Queensland; three specimens in November. I have also seen specimens from Mackay and Townsville; Queensland.

TINEINA.

GELECHIADÆ.

DORYCNOPA, n. g.

Head smooth. Palpi moderate, second joint somewhat triangularly scaled, terminal joint erect, as long as second,

thickened with appressed scales. Antennæ strongly serrate, shortly ciliated in male, hardly 1. Forewings lanceolate-linear, apex pointed, costa faintly sinuate in middle; 3, 4, 5 and 6 widely remote at origin, parallel, equidistant; 7 and 8 out of 6; 9 separate. Hindwings almost 1. Termen strongly emarginate, apex produced; 3 from before angle, 4 from angle, 5 widely remote, parallel to 4, equidistant between 4 and 6, 6 closely approximated to 7 at base.

Differs from *Paltodora*, Meyr., by veins 4 and 5 of forewings being widely remote at base (in that genus they are remote, but not near so widely), the relatively broadly forewings, sinuate costa, and approximation of veins 6 and 7 of hindwings.

Dorycnopa acroxantha, n. sp.

Male, 14 mm. Head, thorax, palpi, antennæ legs and abdomen reddish ochreous, thorax with a large whitish posterior spot, second joint of palpi internally white, antennæ annulated with whitish, posterior legs greyish-ochreous. Forewings elongate-lanceolate, costa faintly sinuate in middle, apex pointed; reddish-ochreous; a narrow transverse oblique ochreous fascia, from costa at one-fourth towards inner margin but not reaching it; ground color between base and fascia darker and appearing raised on edge of fascia; a similar fascia, slightly inwards curved and containing a fine black mark in middle, from costa at four-fifths to before anal angle, ground color darker between posterior extremity and termen; an obscure suffused blackish streak below middle, preceding anterior edge of last fascia; an obscure blackish dot placed on a small spot of lighter ground color midway between the two fasciæ; cilia ochreous-reddish, mixed with fuscous and dark fuscous, becoming wholly ochreous around anal angle. Hindwings with termen emarginate, apex produced; light fuscous; cilia two and a half, ochreous, becoming greyish on terminal third.

Exeter, South Australia; three specimens in December.

Stenopherna, n. g.

Head smooth. Palpi somewhat porrected, roughened with scales, terminal joint one-third of second, acute. Antennæ somewhat dentate, ciliations hardly one-half in male. Posterior tibiæ clothed with short hairs. Forewings elongate-lanceolate, apex pointed; 3 and 4 widely remote at base, nearly equidistant with 5 and 6, 6 separate, 7 and 8 stalked, 7 to costa. Hindwings narrower than forewings; elongate-trapezoidal, apex pointed, produced, termen emarginate; 3, 4, and 5 approximated at base; cilia 3.

Also somewhat allied to *Paltodora*, Meyr., but differs by the very short terminal joint of palpi, shorter ciliations of antennæ and separation of veins 6 and 7 of hindwings.

STENOPHERNA CHIONOCEPHALA, n. sp.

Male and female, 8-11 mm. Head white. Antennæ one-half, fuscous-whitish, palpi fuscous, terminal joint white. Legs fuscous, irrorated with white, tarsi black, ringed with white. Thorax white, somewhat infuscated. Abdomen fuscous. Forewings elongate-lanceolate, apex pointed; dull white, markings fuscous; a basal patch, outer edge nearly straight, from one-sixth costa to one-sixth inner margin; an irregular quadrate spot on inner margin at one-fourth; an irregular trapezoid blotch on costa before middle, reaching three-fourths across wing; an irregular blotch just before apex, reaching across wing to anal angle, sometimes separated into 2 spots by a streak of ground color; some black scales at apex; cilia whitish, finely irorated with black points, especially at base and extremities. Hindwings elongate-trapezoidal, narrower than forewings, apex pointed, produced, termen emarginate; light grey; cilia 1, greyish-ochreous.

Broken Hill, New South Wales; several specimens in October; usually taken at light.

BACTROLOPHA, n. g.

Head smooth. Antennæ serrate, ciliations nearly 1. Palpi moderate, nearly straight, densely rough scaled above and below, terminal joint hardly recurved, almost as long as second, roughly scaled above and below. Posterior tibiæ clothed with long hairs. Forewings elongate, lanceolate, narrow, pointed; 4 and 5 connate or short stalked; 7 and 8 out of 6, 9 out of 8 near base, 7 and 8 long-stalked, both to costa (vein 8 is not well developed). Hindwings almost 1, elongate-trapezoidal, termen emarginate, apex pointed, produced; 3 and 4 approximated at base, 4, 5, and 6 remote at base, nearly parallel; cilia 3.

BACTROLOPHA ORTHODESMA, n. sp.

Male and female, 8-12 mm. Head, palpi, and thorax white, palpi externally ochreous-tinged. Antennæ three-fourths, white, annulated with fuscous; ciliations nearly 1. Abdomen whitish-ochreous, more ochreous on basal segments; in male black. Legs white, tibiæ and tarsi ochreous, terminal tarsi fuscous. Forewings elongate-lanceolate, narrow, pointed; white; three moderately broad suffused pale ochreous equidistant fasciæ, irregularly edged; first from one-sixth costa to one-sixth inner margin; second before middle of costa to before middle of inner margin; third from five-sixths costa to two-thirds of inner margin; a suffused pale ochreous line along termen; cilia white, sprinkled with fine black scales. Hindwings narrower than forewings, elongate-trapezoidal, termen

emarginate, apex pointed, produced; grey-whitish; in male blackish; cilia white.

The variation of color of abdomen and hindwings of male is noticeable.

Broken Hill, New South Wales; four specimens in October.

PYCNOBATHRA, n. g.

Head smooth. Antennæ dentate, nearly three-fourths, ciliations 1. Palpi moderate, second joint more or less dilated with long rough spreading hairs beneath, terminal joint as long as second, recurved, apex acute. Posterior tibiæ somewhat rough haired. Forewings elongate, somewhat lanceolate, apex pointed; 7 and 8 stalked, both to costa, 2 from beyond three-fourths, 3 from angle, 4 widely remote from 3, parallel. Hindwings as broad as forewings; elongate-trapezoidal, apex acute, produced, termen strongly sinuate; cilia over 1; 3 and 4 somewhat approximated at base, 5, 6, and 7 widely remote, parallel.

The dense tuft on the second joint of palpi is very noticeable.

PYCNOBATHRA ACHROA, n. sp.

Male and female, 9-11 mm. Head yellowish ochreous. Thorax ochreous-fuscous, patagia ochreous. Abdomen blackish, anal tuft greyish. Antennæ fuscous. Palpi ochreous-whitish, second joint fuscous laterally and beneath. Legs blackish, posterior pair ochreous-whitish. Forewings elongate-lanceolate, apex pointed; ochreous, sometimes fuscous tinged; a narrow whitish costal streak, attenuated at extremities from base to beyond middle, in pale specimens lost in general ground color; a small ferruginous spot in middle, at one-third from base; a second below and beyond, both usually obsolete; a few fuscous scales towards anal angle; cilia ochreous. Hindwings elongate trapezoidal, apex acute, produced; greyish fuscous; cilia as in forewings, but becoming darker towards base.

Broken Hill, New South Wales; not uncommon in October and November.

ASTHALISTIS EUCHROA, Lower

(PROC. LINN. SOC., N.S.W., P. 47. 1900).

I have recently seen specimens of this species from Townsville, Queensland,, in which the ground color of forewings is greenish, the markings are, however, identical.

YPSOLOPHUS OCHROLOMA, n. sp.

Female, 14 mm. Head and palpi white, second joint of palpi fuscous beneath. Thorax fuscous-whitish, patagia ochreous.

Antennæ and legs fuscous, club of antennæ white beneath. Abdomen greyish-fuscous, two anterior segments yellow. Forewings elongate, moderate, costa nearly straight, apex pointed; dark fuscous, suffusedly irrorated with white; markings dark fuscous; a fine streak along lower edge of cell, from near base to posterior extremity, somewhat interrupted before middle; a short ochreous dash beneath anterior extremity; a streak of ochreous before termen from near apex to anal angle, containing 2 black spots near apex, and edged anteriorly throughout by an obscure line of fine blackish scales; veins more or less outlined with fuscous; cilia light fuscous, with median and terminal white lines, more pronounced towards and around apex. Hindwings with termen emarginate, apex pointed; light-fuscous; cilia greyish-fuscous, becoming ochreous at base.

Allied to *trichombrous*, Lower, but differs by fuscous lines of forewings, and especially by the ochreous streak before the termen, a character not shared by any of its allies, and which distinguishes it at once.

Broken Hill, New South Wales; eight specimens in August and September.

YPSOLOPHUS ARGONOTA, n. sp.

Male and female, 10-12 mm. Head, thorax, palpi, legs and antennæ white, antennæ mixed with fuscous on terminal half. Abdomen whitish, two anterior segments pale ochreous. Forewings elongate, moderate, costa nearly straight, apex pointed; 7 and 8 out of 6; white, very minutely irrorated with blackish throughout, leaving costal edge obscurely white; cilia ochreous-whitish, with a few blackish scales at base. Hindwings with termen emarginate, apex pointed, produced; light fuscous; cilia greyish-ochreous.

Known from its allies by the absence of any definite markings and whitish coloring. It is nearest *cycnoptera*, Lower, but differs in its smaller size and absence of longitudinal white median streak.

Broken Hill, New South Wales; three specimens in October

I formerly regarded this species, and its allies as species of *Paltodora*, Meyr., but Mr. Meyrick referred them to the present genus, and although the characters do not agree with those given in his "Handbook of British Lepidoptera," I place them here until the group is revised. All those I have recently examined from this region have veins 7 and 8 out of 6, and 2 and 3 widely remote at base; the hindwings (which are emarginate) having 3 and 4 connate, 5 somewhat approximated to 4, and 6 and 7 stalked. This latter character would separate them from *Paltodora*. The following species is very different in appearance, and the neuration is quite different, *i.e.*, 2 and 3 and 7 and 8 of forewings are stalked, and hind-

wings are trapezoidal with termen hardly sinuate, but the neuration is similar to those previously described of similar appearance.

Ypsolophus thanatopsis, n. sp.

Male, 12 mm. Head, palpi, thorax, abdomen, and antennæ ochreous grey; palpi paler internally, second joint black externally, antennæ spotted with blackish. Legs blackish, posterior pair mixed with grey. Forewings elongate, moderate, somewhat dilated posteriorly, costa gently arched, termen obliquely rounded; 2 and 3 stalked; greyish-fuscous, slightly paler along costa, minutely dotted with darker fuscous dots, 3 arranged in a longitudinal series on fold at one-fourth, before and beyond middle, more conspicuous; a row of small black dots along termen; cilia greyish-fuscous. Hindwings with termen hardly sinuate; dark fuscous; cilia as in forewings.

Closely allied to *dryina*, Lower, but differs by its much smaller size, dots along termen and color of hindwings.

Cooktown, Queensland; two specimens in February.

Xyloryctidæ.

Maroga paragypsa, n. sp.

Male, 40 mm. Head, palpi, thorax, and antennæ creamy-white, terminal joint of palpi less than one-half of second. Abdomen orange, darker on posterior segments, white beneath. Legs ochreous-whitish, middle and posterior tibiæ orange, tarsi of anterior legs blackish. Forewings elongate-oblong, costa slightly arched towards base, termen rather obliquely rounded: 7 to apex, 3 from just before angle; creamy-white, sparsely irrorated with some minute blackish scales, which become somewhat ochreous towards base; cilia white. Hindwings and cilia creamy white, basal and inner marginal areas clothed with long yellowish hairs.

Between *setiotricha*, Meyr., and *unipunctana*, Don, but not very near either.

Roeburne, Western Australia; one specimen. (Type in *Coll. Lyell*).

Cryptophaga hyalinopa, n. sp.

Male, 30 mm. Head, palpi, thorax, and legs fleshy-ochreous, head somewhat pinkish tinged, tarsi ringed with blackish. Antennæ blackish, pectinations 2. Abdomen blackish, second segment orange-red. Forewings elongate, moderate, costa nearly straight, termen obliquely rounded; fleshy-ochreous, darker on basal third; a fine black dot in disc at one-third, a second at posterior extremity of cell, and a third obliquely below and before; two others on fold beyond middle; an obscure row of fine blackish dots along termen to anal angle, not reaching apex.

Hindwings semi-hyaline, basal two-thirds black; cilia whitish becoming fuscous around anal angle. Underside of both wings with basal two-thirds densely black.

Nearest *balteata*, Walk., but very distinct by the curious semi-hyaline hindwings. I received this species from the late Mr. G. Barnard as *sarcinota*, Meyr., but having now received that species I find that there is a very great difference between the two.

Duaringa, Queensland; one specimen in October.

Cryptophaga panleuca, n. sp.

Male, 34 mm. Head, palpi, antennæ, legs, thorax, and abdomen white, antennæ pectinations 4, second segment of abdomen orange red, remainder of segment narrowly orange. Forewings elongate-oblong, costa gently arched, termen rounded, oblique; 2 from considerably before the angle; white, without markings; cilia shining white. Hindwings shining snow white; a row of black dots along termen; cilia snow white.

Similar in appearance to *epadelpha*, Meyr., but the white hindwings separate it at once from that species.

Cooktown, Queensland; one specimen (? taken in October).

Xylorycta pentachroa, n. sp.

Male, 34 mm. Head, antennæ, and thorax whitish, thorax with a broad black longitudinal stripe. Antennal ciliations 1. Palpi and legs ochreous. Palpi very short. Abdomen blackish, segmental margins dull ochreous. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; 2 from three-fourths; fleshy-ochreous, markings orange suffusedly edged with blackish scales; a moderate spot in disc at one-third from base; a second, elongate, obliquely below and beyond, and 2 others moderately, obliquely placed beyond posterior extremity of cell; some fine blackish scales on area of makings; 3 and 4 stalked; 6 and 7 stalked; cilia dark fuscous. Hindwings yellow, becoming darker towards termen; cilia dark fuscous.

The markings of this species are similar to those on *Blackburnii*, Lower, but the coloring is very different. The very short palpi recalls *neomorpha*, Turner.

Broken Hill, New South Wales; one specimen in December.

Xylorycta cephalochra, Lower.

I have received a specimen from Cooktown, Queensland, in which veins 7 and 8 of forewings are coincident, a curious variation.

Lichenaula ombralota, n. sp.

Female, 24 mm. Head and thorax snow-white (palpi broken). Antennæ fuscous. Legs whitish. Abdomen greyish, beneath whitish, segmental margins, narrowly dull orange. Forewings elongate, moderate, costa gently arched, apex round pointed, termen sinuate beneath apex, hardly rounded; 2 from two-thirds, 7 to apex; dark fuscous, suffusedly mixed with whitish and black scales; a broad white costal streak from base to apex, attenuated at extremities and broadly interrupted by ground color at two-thirds; a somewhat dot-like fuscous streak, from posterior extremity of ground color interrupted along costa to apex and continued as a fine line along termen to anal angle; veins towards termen outlined in black and edged with whitish; a suffused ferruginous spot on fold at one-third, edged posteriorly by a similar-sized white spot; a similar white spot beyond extremity of cell; cilia whitish, light fuscous on basal half, and with a very distinct blackish terminal line around apical portion. Hindwings fuscous; cilia as in forewings.

Nearest *undulatella*, Walk.

Bairnsdale, Victoria; one specimen, in January.

Xylorycta tetrazona, n. sp.

Female, 30 mm. Head and palpi orange-yellow. Antennæ fuscous, basal joint yellow. Thorax white, with a moderately broad anterior fuscous band, and a fuscous posterior spot. Legs and abdomen orange-yellow. Forewings elongate, moderate, costa gently arched, termen gently rounded, oblique; 2 from three-fourths; white, markings fuscous; a narrow streak along costa from base to before third fascia; four moderately broad nearly equidistant fasciæ, first near base, narrowest in middle; second, somewhat curved inwardly from middle of costa to inner margin; third from costa at five-sixths to just before anal angle; nearly straight; fourth along termen; between the third and fourth are 2 fuscous spots on costa; an irregular suffused streak on inner margin between second and third fasciæ; cilia whitish (imperfect). Hindwings with termen rounded, sinuate beneath apex, apex faintly produced; orange-yellow, becoming broadly fuscous from apex to beyond middle of termen, finely attenuated posteriorly; cilia orange-yellow.

Apparently nearly allied to *ophiogramma*, Meyr., but immediately separated by the extra fascia (in the former species there are but three), and the yellow hindwings.

Stawell, Victoria; one specimen taken in November.

Œcophoridæ.

Crypsynarthra, n. g.

Head with appressed hairs. Antennæ moderate, in male with long fine ciliations, 3, shorter towards apex, without pecten, or with one or two fugitive hair scales. Palpi moderate, recurved, ascending, second joint thickened with dense scales, hardly reaching base of antennæ, terminal joint nearly as long as second, acute. Abdomen moderate. Posterior tibiæ thickened, clothed with dense hairs. Forewings elongate-oblong, termen oblique rounded, with 11 veins (normal veins 7 and 8 being coincident), 7 to costa, 2 from considerably before angle of cell, 4 and 5 somewhat approximated at base. Hindwings with termen rounded; neuration normal.

Mostly allied to *Atelosticha*, Meyr., but the long fine ciliations of antennæ and oblique termen are reliable characters.

Crypsynarthra chrysias, n. sp.

Male, 24 mm. Head, thorax, palpi, and antennæ reddish-fuscous, second joint of palpi somewhat whitish internally and reddish externally. Abdomen ochreous. Legs fuscous, posterior tibiæ clothed with yellow hairs, anterior and middle pair irregularly banded with whitish. Forewings elongate, moderate, costa gently arched, apex round pointed, termen obliquely rounded; reddish-fuscous, minutely irrorated with blackish; a suffused blackish mark on costa before middle, continued irregularly and obliquely to inner margin, but not reaching it; a small blackish spot at end of cell; cilia blackish. Hindwings with termen rounded; orange-yellow; cilia as in forewings. Forewings beneath yellowish-orange, costal edge dark fuscous.

Recalls species of *Heliocausta*.

Duaringa, Queensland; one specimen in December.

Hoplitica pseudota, n. sp.

Male, 22 mm. Head, palpi, and thorax fleshy-fuscous, palpi beneath whitish, somewhat fuscous on sides. Antennæ fuscous, obscurely annulated with whitish, ciliations (2). Abdomen greyish-ochreous, anterior legs dark fuscous, middle and posterior pair silvery white, tibiæ and tarsi fuscous tinged above. Forewings elongate, rather broad, costa gently arched, termen obliquely rounded; 7 to apex; dull fleshy-ochreous; costal edge obscurely whitish from base to three-fourths; markings dull purplish; some scales around cell and along fold, hardly forming definite markings; two spots in cell, one in middle and one at posterior extremity; a suffused spot beyond middle of inner margin; an outward curved line of

obscure scales from beneath costa to inner margin at anal angle; cilia ochreous, flesh colored at base. Hindwings greyish-ochreous, fuscous tinged around apex; cilia ochreous-fuscous, with an ochreous basal line.

Allied to *carnea*, Z., to which it is very similar in appearance, but the absence of dots along termen, white legs, and longer antennal ciliations are distinctive.

Duaringa, Queensland; one specimen in December.

TRACHYNTIS ARGOCENTRA, n. sp.

Male and female, 22-25 mm. Head and palpi fuscous-whitish, second joint of palpi dark fuscous on basal half, especially internally. Thorax and antennæ fuscous. Abdomen greyish, faintly suffused with ferruginous. Legs fuscous, posterior pair greyish. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; fuscous, sparsely mixed with greyish; an elongate streak of dull whitish in cell, sometimes absent, with spot of fuscous at extremities; a row of more or less connected fuscous spots along termen and apical fourth of costa; cilia fuscous. Hindwings greyish-fuscous; cilia greyish-fuscous, faintly ochreous tinged at base.

Broken Hill, New South Wales; three specimens in April.

GOMPHOSCOPA, n. g.

Head rather loosely haired. Antennæ in male bidentate, especially on terminal half, ciliations (1), basal joint short, without pecten. Labial palpi extremely long, second joint considerably exceeding base of antennæ, clothed with appressed scales, somewhat loose beneath, terminal joint slender, one-half of second recurved. Forewings elongate; 7 and 8 stalked, 7 to apex, 2 from before angle of cell, 3 from angle, 1 furcate at base. Hindwings over 1, elongate-ovate; cilia one-third; 3 and 4 connate, 5 widely remote from 4, nearer to 6.

Not very near any other genus known to me. The absence of pecten, extremely long palpi, termination of vein 7 in apex, and elongate markings would appear to have some relationship to *Œnochroa*, Meyr., yet the affinity is not clear.

The genus is formed for the reception of *Pachycera catoryctopsis*, Lower (Trans. Roy. Soc. S.A., 184 (1893). The genus was not defined at the time of writing, and as the name, *Pachycera*, is probably preoccupied, I adopt the above in place of it.

LINOSTICHA EUADELPHA, n. sp.

Male, 14 mm. Head, palpi, and antennæ reddish-fuscous; second joint of palpi rather thinly scaled. Thorax dark fuscous, patagia reddish-fuscous. Abdomen greyish. Legs fus-

cous, posterior pair greyish-ochreous, middle and posterior tarsi suffusedly ringed with whitish. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; reddish-ochreous, finely irrorated with dark fuscous scales; a black spot, usually double, at one-third from base in middle; a similar spot at end of cell, slightly oblique; a strongly curved transverse line of fine blackish scales from five-sixths of costa to anal angle, indented beneath costa; a suffused blackish line of scales along termen; cilia ochreous-reddish, mixed with a few blackish scales. Hindwings light fuscous; cilia greyish-ochreous, reddish tinged at base.

Closely allied to *cremnodisema*, Lower, but separable by the narrower wings, more slender palpi and transverse line before termen. These characters are very constant.

Brokn Hill, New South Wales; several specimens in June.

Cyclogona, n. g.

Head with appressed scales. Antennæ serrate, in male moderate, evenly ciliated ($1\frac{1}{2}$), basal joint moderate without pecten. Palpi moderate, second joint reaching base of antennæ, thickened with appressed scales, slightly rough beneath, terminal joint almost as long as second, slender, recurved. Thorax smooth. Forewings elongate, moderate, apex rounded, termen obliquely rounded. Hindwings elongate-ovate, nearly one; cilia one-half. (Posterior tibiæ broken.) Forewings with 7 and 8 stalked, 7 to apex, 2 and 3 on a curved stalk from before angle of cell. Hindwings with 3 and 4 slightly remote at base.

Intermediate in character between *Eulechria*, Meyr., and *Phloeopola*, Meyr., but in my judgment mostly allied to the former. It, however, differs from both the above genera by the stalking of veins 2 and 3 of forewings, a character shared only by *Guestia*, Meyr., and the allied genera, in which, however, vein 7 terminates on costa. The absence of basal pecten of antennæ is similar to *Phloeopola*, Meyr.

Cyclogona orthoptila, n. sp.

Male, 25 mm. Head and palpi white, second joint of palpi dark fuscous on basal half externally. Thorax, legs, and antennæ fuscous-whitish, patagia ochreous-fuscous. Abdomen greyish. Forewings elongate, moderate, costa gently arched, termen very obliquely rounded; white, with dark fuscous markings; a short, narrow, elongate spot beneath costa at base; a moderate spot above middle before one-third, a second just below and before, a third in middle of cell, a fourth at posterior extremity of cell, a fifth on costa just above fourth, the last two more or less connected by an ochreous shade; an outward

curved series of elongate spots from costa at four-fifths to anal angle, strongly indented beneath costa; cilia ochreous-whitish, more of less barred with ochreous-fuscous. Hindwings grey, cilia greyish-white.

Melbourne, Victoria; one specimen in December.

NEPHOGENES CENTROTHERMA, n. sp.

Male, 18 mm. Head and palpi light fleshy-red, palpi darker beneath. Antennæ and thorax dark fuscous, thorax with a moderate fleshy-red posterior spot. Abdomen and legs greyish-ochreous, anterior and middle pair fuscous beneath. Forewings elongate, moderate, costa hardly arched, termen obliquely rounded; dark fuscous; markings fleshy-red; a moderate spot at base of costa; a short elongate streak along inner margin at base; a moderate spot at one-third from base in middle, a second, similar before two-thirds, in middle, both edged with a few prominent black scales; an interrupted narrow streak along fold anteriorly, somewhat obscured; cilia greyish, mixed with blackish and fuscous scales, especially towards base. Hindwings fuscous; cilia as in forewings.

Somewhat allied to *pyrocentra*, Lower, but differs from its smaller size, different colored head, palpi and forewings. *pyrocentra* varies considerably; the type specimen represented an extreme form, as most of the specimens have fleshy-red forewings, not dark fuscous, and very few markings. The description of that species, therefore, requires broadening.

NEPHOGENY PERIGYPSA, n. sp.

Male, 20 mm. Head, palpi, and thorax snow-white. Antennæ and legs fuscous, base of antennæ whitish, posterior legs greyish-ochreous. Forewings elongate, moderate, costa faintly arched, termen very obliquely rounded; white; costa narrowly fuscous from base to one-third; a moderate, suffused light fuscous streak from middle of base to costa at two-thirds, ground color above snow-white; a similar streak along fold from base to two-third, somewhat spot-like at posterior extremity and confluent with first streak on base third; a well defined oblique ochreous-fuscous streak before termen, from beneath apex to before anal angle; cilia white, mixed with fuscous scales in middle. Hindwings and cilia very pale ochreous.

Closely allied to *olympias*, Lower, but separable by the different ground color of forewings and white head; it approaches *melanthes*, Lower, also, but in addition to the characters given above it may be distinguished from that species by the very pale hindwings and markings of forewings.

Broken Hill, New South Wales; two specimens in October.

NEPHOGENES PETRINODES, n. sp.

Male, 34 mm. Head, palpi, antennæ, and thorax grey. Palpi grey-whitish. Legs and abdomen greyish-fuscous. Forewings elongate, moderate, somewhat dilated posteriorly, costa gently arched, termen obliquely rounded; grey-whitish; a fuscous spot at base of inner margin; a fuscous spot in disc at one-third from base, a second just below and slightly beyond, a third, double at extremity of cell, and a fourth on upper margin of cell midway between first and third; a curved suffused fuscous streak, from costa before apex to anal angle, indented beneath costa; a row of black dots along termen; cilia grey. Hindwings greyish-fuscous, cilia grey-whitish, with 2 faint fuscous lines.

Nearest *atrisignis*, Lower, but immediately separated by the color of forewings and paucity and clearness of markings.

Broken Hill, New South Wales; one specimen in June.

NEPHOGENES XIPHOLEUCA, n. sp.

Male and female, 18-22 mm. Head, thorax, palpi, and antennæ white, thorax and patagia slightly infuscated, second joint of palpi beneath light fuscous, apex white, antennæ obscurely spotted with fuscous. Legs whitish, somewhat infuscated. Abdomen greyish-ochreous, segmental margins whitish. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; light ochreous-fuscous; a narrow white streak along costa, from base to three-fourths, attenuated at extremities; all veins neatly outlined with white; ground color between veins towards termen darker; a small fuscous spot in middle at one-third from base, a second immediately below, and a third at end of cell, these spots are generally obsolete; a few fuscous scales along termen; cilia greyish-ochreous. Hindwings elongate-ovate; light fuscous; cilia as in forewings.

Not very near any other; the neatness and clearness of markings is particularly noticeable.

Broken Hill, New South Wales; six specimens in April; also from Birchip, Victoria.

HETEROBATHRA, n. g.

Head with appressed scales. Antennæ without pecten (?), ciliations of male (?). Palpi very long, recurved, second joint very long, considerably exceeding base of antennæ, densely clothed with appressed scales, especially at apex, terminal joint slender, acute, about one-fourth of second. Abdomen moderate. Posterior tibiæ clothed with long fine hairs. Forewings elongate, moderate, termen very obliquely rounded, 7 and 8 stalked, 7 to immediately above apex, 2 and 3 strongly

curved downwards, 2 from before angle of cell. Hindwings over 1, elongate-ovate, termen rounded, cilia one-third.

Somewhat allied to *Nephogenes*, Meyr., but the curious palpi, absence of pecten (?), and termination of vein of above apex are distinctive characters.

HETEROBATHRA XIPHOSEMA, n. sp.

Female, 22 mm. Head, palpi, and thorax cinereous grey. Abdomen greyish. Legs cinereous-fuscous, posterior pair whitish. Forewings elongate, moderate, costa gently arched, termen very obliquely rounded; ashy-grey-whitish; a slightly curved moderate black longitudinal streak above middle, from base of costa to just above apex of wing, thickest on basal third; a black spot at one-third from base; a second, similar, at end of cell, both touching longitudinal streak; cilia grey-whitish. Hindwings with termen rounded; grey-whitish; cilia grey-whitish.

The longitudinal black streak is very conspicuous.

A similar color and marking occurs in *Scoparia mesogramma*, Lower, one of the *Pyralidina*.

Broken Hill, New South Wales; two specimens in August.

HETEROBATHRA BIMACULA, n. sp.

Female, 12 mm. Head, palpi, thorax, and antennæ dark fuscous, second joint of palpi sprinkled with white beneath. Legs fuscous, sprinkled with whitish, anterior coxæ white. Abdomen greyish-ochreous, segmental margins silvery-grey. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; dark fuscous, mixed with blackish; a distinct black dot encircled with white in middle of disc before middle; a second, similar, below and slightly beyond; an obscure Y-shaped blackish mark from base, just reaching first encircling ring; veins towards termen more or less outlined with black; a well-defined row of blackish dots along termen, continued to anal angle; cilia grey-whitish. Hindwings with termen rounded; dull fuscous; cilia greyish-fuscous.

Broken Hill, New South Wales; two specimens in August.

HETEROBATHRA (?) SEMNOSTOLA, n. sp.

Male, 18 mm. Head, palpi, thorax, and antennæ cinereous-grey, palpi imperfect, second joint whitish beneath, antennæ with moderate pecten, ciliations 1. Legs fuscous, posterior pair greyish. Abdomen ochreous-grey, strongly margined on posterior two-thirds with fuscous. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; ashy-grey-fuscous, lighter on dorsal half; a moderately thick black

longitudinal median streak, from near base to apex, attenuated posteriorly and nearly connected with costa at base by a narrow fuscous shade; streak edged below in middle by a fine white line, which becomes dot-like at posterior extremity; a fine short black line along fold towards base; a small black spot below commencement of white streak; a row of black elongate spots along termen; cilia cinereous-grey, becoming blackish at base and on streak. Hindwings elongate-ovate; termen rounded; light fuscous; cilia greyish fuscous, becoming greyish-ochreous at base.

This species, which resembles *xiphosema* very closely, is doubtfully referable to this genus. The palpi are unfortunately broken, with the exception of the second joint, which agrees in structure with the genus, but the well-developed pecten of the antennæ is discordant, as in both the previous species examined it is absent, although the material at my command is scanty, so that I cannot insist on the point. Should it ultimately prove to be correctly located, then the characters of the genus will have to be altered so as to read: Antennæ with moderate pecten, basal joint moderate, ciliations (1). The present species differs chiefly from *xiphosema* by the narrower forewings, elongate dots along termen and fuscous hindwings.

Broken Hill, New South Wales; one specimen in August.

Psorosticha, n. g.

Head with appressed scales. Thorax strongly crested posteriorly. Antennæ dentate, shortly ciliated, with pecten. Palpi moderate, recurved, second joint hardly exceeding base of antennæ, densely and roughly clothed with appressed scales, terminal joint shorter than second, thickened with rough scales at two-thirds, apex acute. Abdomen rather broad. Posterior tibiæ clothed with long hairs. Forewings elongate, moderate, termen obliquely bowed, surface with tufts of scales; 2 and 3 stalked, 7 and 8 stalked, 7 to just above apex. Hindwings elongate-ovate, 3 and 4 from a point, 5 approximated to 4 at base, 6 and 7 parallel, cilia over one-third.

Not very near any other Australian genus known to me. Its nearest ally appears to be *Trachypepla*, Meyr., but the gap is rather considerable on account of the stalking of veins 2 and 3 of forewings and short antennal ciliations. In structure it more nearly approaches the European genus *Exaeretia*, *Stt.*, differing principally by the termination of vein 7 on costa, and raised scales on forewings. The species here described has the facies of a *Gelechia*.

PSOROSTICHA ACROLOPHA, n. sp.

Male, 16 mm. Head and thorax blackish, face whitish, patagia fleshy-ochreous anteriorly. Second joint of palpi fuscous, internally somewhat whitish, terminal joint fleshy-ochreous, with a broad blackish median band. Antennæ and abdomen greyish-fuscous. Legs fuscous, suffusedly and irregularly banded with greyish-ochreous. Forewings elongate-oblong, hardly dilated, termen bowed, oblique; greyish-ochreous, fuscous tinged; a short black basal fascia, with a tuft of scales at extreme base; costa irregularly spotted with blackish scales; an oblique transverse row of three small tufts of scales; anterior edge blackish, first on costa at one-fourth, third on fold at one-third, second between first and third; two similar tufts, first on a small triangular black spot on costa at about two-thirds, second obliquely below and beyond; a moderate, irregular triangular blackish spot on costa at apex, containing a suppressed tuft of scales on its lower edge; 2 or 3 minute black spots immediately below; 4 minute black spots along termen; cilia ochreous-fuscous. Hindwings with termen rounded; greyish-fuscous, darker round termen and towards apex; cilia greyish-ochreous, with fuscous subbasal and subterminal lines.

Readily recognised by the black basal fascia.

Cooktown, Queensland; one specimen in January.

COMPSOTROPHIA SELENIAS, Meyr.

(Proc. Linn. Soc., New South Wales. *Œcophoridæ* Xi., p. 46.) I have received a specimen, taken in December, from Tasmania, which I consider the female of this species. The forewings are exactly as in the male, but the hindwings are not yellow, but black, and the size (16 mm.) is much smaller. I would have named the species as new, but, taking into consideration the slight deviation in the hindwings of *strophiella*, Meyr., it appears desirable to refrain from doing so at present, as further observation is needed to definitely decide the point, although I have little doubt but what my identification is correct.

PELTOPHORA PHAEDROPA, n. sp.

Male, 20 mm. Head, palpi, antennæ, and thorax very dark fuscous, posterior portion of patagia yellow, antennal ciliations 3. Legs and abdomen blackish, posterior legs orange, abdomen ringed with orange, anal tuft orange. Forewings elongate, moderate, costa gently arched, termen oblique, nearly straight; blackish, with yellow markings, a very narrow subcostal streak from base to one-third, posteriorly attenuated;

four moderately broad transverse fasciæ, first not near reaching costa, at one-fourth from base, faintly produced along fold, and just reaching inner margin; second not near reaching either margin, somewhat quadrate, placed exactly in middle of wing; third from just beneath costa to anal angle, oblique, and with a rounded sinuation in middle; fourth just before apex, triangular, a few yellowish scales along termen; cilia blackish. Hindwings very dark fuscous; cilia orange, becoming blackish above middle and at base.

I am inclined to place this insect in the genus *Linosticha*, Meyr., but the termination of vein 7 is just below the apex; the rather short palpi and antennal ciliations would certainly seem to indicate that genus as being its proper position. The apex of both wings on the underside is orange; a curious form of markings.

Perth, Western Australia; one specimen received from Mr. S. Angel, taken in November.

Philobota isozona, n. sp.

Female, 20 mm. Head orange. Palpi, antennæ, thorax, and abdomen dark fuscous, palpi internally orange, second joint with suffused apical and subapical orange rings, terminal joint yellowish, thorax with a yellow posterior spot, antennæ faintly annulated with yellow. Legs orange-yellow, anterior and middle tibiæ and tarsi spotted above with fuscous. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; dark fuscous, with five yellowish blotches, first on inner margin near base, somewhat triangular, reaching nearly to costa; second cuneiform, on costa before middle, third similar, on costa at three-fourths; fourth irregular quadrate on inner margin beyond middle, reaching half across wing, only separated from third by a streak of ground color; fifth suffused, irregular, just before termen in middle; cilia dark fuscous, becoming yellowish in middle and at anal angle. Hindwings bronzy-fuscous, becoming orange on basal half; cilia fuscous.

Perhaps nearest *lunata*, Turner, but very differently colored, although the markings are somewhat similar on forewings.

Derby, Western Australia; one specimen in December.

Cæsyra miltozona, n. sp.

Male, 10 mm. Head orange. Palpi yellow, second joint fuscous beneath. Antennæ and thorax dark purplish-fuscous. Legs fuscous, posterior pair ochreous. Abdomen greyish. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; bright yellow, with bright red markings;

a basal fascia, from one-third costa to one-third inner margin; a similar fascia from costa at three-fourths to anal angle, with a rounded projection on each side in middle, and leaving a spot of ground color on fasciæ between; a moderate line along termen; cilia yellow, becoming grey on lower half.

In the neighborhood of *personata*, Meyr.

Derby, Western Australia; one specimen in October.

ACOMPSIA EPILEUCA, n. sp.

Female, 16 mm. Head, palpi, antennæ, and thorax fuscous, second joint of palpi with whitish subapical band, antennæ with pecten, abdomen yellow. Legs ochreous, anterior and middle tibiæ and tarsi banded with fuscous. Forewings elongate, moderate, costa hardly arched, termen oblique, hardly rounded, 7 and 8 stalked, 7 to costa, 2 and 3 separate; fuscous, suffusedly mixed with whitish, especially along costa and posterior half of wing; a dark fuscous spot on costa at one-third, a second, larger, on middle of costa; a longitudinal series of 3 ovate, blackish white edged spots in middle of wing; 3 suffused blackish costal spots, between three-fourths and apex; a small blackish patch on termen above anal angle; cilia greyish, with a row of blackish spots at base, which are continued right around apex to costal cilia. Hindwings fuscous, becoming ochreous-tinged at base; 3 and 4 connate, 5 very closely approximated to 4 at base; cilia light fuscous, ochreous tinged at base. The neuration of hindwings is curious.

Duaringa, Queensland; one specimen in January.

ŒCOPHORA IODES, n. sp.

Female, 20 mm. Head, palpi, thorax, and antennæ deep fuscous, somewhat purplish tinged, second joint of palpi with a blackish subapical ring, apex grey-whitish, antennæ without pecten. Anterior and middle legs fuscous, tarsi obscurely banded with white, posterior pair grey. Abdomen grey-whitish. Forewings elongate, moderate, costa moderately arched, termen very obliquely rounded; 2 and 3 separate; dull purplish-fuscous; an irregular suffused black streak in middle of wing from base to posterior extremity of cell; a suffused blackish spot on inner margin near base; a row of blackish dots along termen, continued around apex to costa, where they become more elongate; cilia fuscous-purplish. Hindwings with 3 and 4 connate; grey, faintly fuscous tinged at apex; cilia grey.

Not very near any other known to me, but somewhat like *Guestia uniformis*, Meyr., but the separation of veins 2 and 3

of forewings and absence of pecten are reliable points of distinction. The genus *Œcophora*, Latr., as now restricted by Mr. Meyrick in his "Handbook of British Lepidoptera," possesses the characters of this species, *i.e.*, absence of antennal pecten, vein 7 to costa, 2 and 3 separate. Hindwings with 3 and connate or stalked.

Blackwood and Parkside, South Australia; two specimens in August.

Guestia actinipha, n. sp.

Female, 22 mm. Head, palpi, thorax, and antennæ whitish, faintly fuscous tinged, second joint of palpi beneath light fuscous, except apex, antennæ with moderate pecten. Abdomen grey-whitish. Legs white, posterior pair ochreous tinged. Forewings elongate, moderate, costa moderately arched, termen obliquely rounded; light cinerous-grey; costal edge narrowly whitish from one-third to apex; a moderately broad longitudinal white streak lying in middle of cell; cell outlined more or less with fuscous on lower edge, and continued to posterior extremity, where it is spot-like and more sharply defined; a suffused fuscous spot in disc above middle at one-third; a similar but more suffused spot just below and beyond, almost resting on, and indicating commencement of line along cell; a somewhat suffused elongate whitish streak above middle, between posterior extremity of cell and termen; a suffused fuscous line along termen; cilia grey-whitish. Hindwings grey; cilia light ochreous-grey.

The white longitudinal streak and different ground color easily separate this from the other described species.

Broken Hill, New South Wales; one specimen in May.

Guestia peladelpha, Lower.

I have a specimen of this insect, taken at Roeburne, Western Australia, in which vein 6 of the forewings is long-stalked, in addition to the usual neuration. It is a curious deformity, occurring in one wing only.

Pauronota, n. g.

Head moderately smooth. Antennæ in male moderately ciliated (1), basal joint moderate, with pecten. Labial palpi short, recurved, second joint not reaching base of antennæ, with appressed scales, somewhat loose beneath, terminal one-half of second, acute. Thorax smooth. Posterior tibiæ clothed with long hairs above. Forewings with vein 1 furcate, 7 and 8 stalked, 7 to costa, 2 and 3 rising on a curved stalk out of 4 near origin. Hindwings ovate-lanceolate, cilia 1; 3 and 4 connate, 6 and 7 parallel.

Allied to *Guestia*, Meyr., but differs by the very short palpi, shape of hindwings and longer cilia.

PAURONOTA THERMALOMA, n. sp.

Male, 18 mm. Head reddish-fuscous. Palpi, antennæ, and thorax fuscous, patagia reddish-fuscous. Legs fuscous, posterior pair grey-whitish, all tibiæ and tarsi obscurely ringed with whitish. Abdomen greyish-ochreous, anal tuft ochreous. Forewings elongate, moderate, costa hardly arched, apex somewhat pointed, termen very obliquely rounded; fuscous; all veins more or less outlined with darker fuscous; a small dark fuscous line on inner margin near base; a suffused line of dark fuscous scales along termen; cilia fuscous, becoming distinctly light reddish on basal half, and with a few blackish scales at base. Hindwings grey; cilia grey, ochreous tinged on basal half.

Broken Hill, New South Wales; one specimen in July.

MACROBATHRA DROSERA, n. sp.

Male, 16 mm. Head and palpi greyish-fuscous, dusted with whitish. Antennæ and legs dark fuscous. Abdomen fuscous, segmental margins silvery-grey. Forewings elongate-lanceolate; blackish; markings dull whitish, finely irrorated with fuscous; 3 equidistant, somewhat flattened triangular spots at one-sixth, before middle and before apex, the latter one almost reaching dorsal streak; a moderately broad dorsal streak, from base to anal angle, broadest on basal half, and with a slight sinuation on upper edge beyond middle; cilia greyish-fuscous, mixed with whitish and blackish scales at base. Hindwings fuscous; cilia greyish-ochreous.

Not very near any other; easily recognised by the markings not being white or yellow, which colors are predominant in this group.

Broken Hill, New South Wales; one specimen in October.

MIMODOXA, n. g.

Head smooth. Antennæ in male slender, moderately and evenly ciliated, basal joint elongate, without pecten. Palpi moderately long, second joint not nearly reaching base of antennæ, with appressed scales, moderately smooth beneath, terminal joint as long as second, slender recurved. Thorax smooth. Forewings elongate-lanceolate. Hindwings as broad as forewings, broadly-lanceolate; cilia one and a half. Abdomen somewhat flattened. Posterior tibiæ clothed with long hairs above. Forewings with 7 and 8 stalked, 2 from considerably before angle of cell, 3 from angle,

lower fork of vein 1 hardly obsoete towards base. Hindwings with 3 and 4 connate, 5 absent, coincident with 4.

Allied to *Macrobathra*, Meyr., but differs by neuration of hindwings. The absence of vein 5 is unusual in the *Œcophoridæ;* but Mr. Meyrick, to whom a specimen was submitted, placed it in this family.

MIMODOXA DRYINA, n. sp.

Male, 9-10 mm. Head, palpi, and thorax fuscous-whitish, second joint palpi internally blackish, and with an obscure whitish apical ring. Antennæ fuscous, irregularly annulated with white, basal joint black, with an obscure whitish ring at apex. Abdomen greyish, strongly margined with fuscous. Legs whitish, irregularly banded with fuscous, posterior pair greyish-ochreous. Forewings elongate-lanceolate; fuscous-whitish; becoming darker at base; markings black; a narrow strongly oblique fascia from costa near base to inner margin at one-sixth; a second similar fascia, more obscure, from one-third of costa to inner margin in middle, hardly reaching inner margin; a third, thicker and irregular from five-sixths costa to anal angle, broadest on costa; a more or less well-defined narrow longitudinal median streak from base to apex, suffused at apex; cilia dark fuscous, mixed with whitish. Hindwings lanceolate, thinly scaled; pale grey; fuscous towards apex; cilia ochreous-grey.

Broken Hill, New South Wales; three specimens in October.

EUCRYPTOGONA, n. g.

Head somewhat rough haired. Antennæ serrate, with tufts of long ciliations at joints, about 5, without pecten, or with one or two fugitive hair scales. Palpi porrect, terminal joint concealed, second dilated towards apex, clothed with long rough hairs above and beneath. Posterior tibiæ with long fine hairs. Forewings elongate, moderate, termen oblique; all veins separate, secondary cell distinct, 1 furcate at base, 2 from before angle, 6 and 7 remote at base, 7 to termen. Hindwings as broad as forewings, termen obliquely round; 3 and 4 widely remote at base, 5 and 6 parallel to 4, 6 to termen.

A very singular genus, which, I think, should be referred to the *Plutellidæ*, as the separation of all veins when present is a character which does not occur in the *Œcophoriaæ*. The long ciliations of antennæ and haired tibiæ of hindlegs are characters which are discordant in the former family, yet the curious palpi would appear to indicate some relationship to the latter family, especially in the genus *Pleurota*. Hb.

EUCRYPTOGONA TRICHOBATHRA, n. sp.

Male, 20 mm. Head, palpi, and thorax reddish-fuscous, thorax with 2 reddish porrected tufts of hair on anterior edge. Antennæ fuscous; ciliations nearly 5. Legs fuscous, posterior pair ochreous-grey, tibiæ clothed with long ochreous hairs, all tarsi ringed with ochreous. Abdomen fuscous. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; greyish-fuscous, strongly mixed with ferruginous, reddish, and black scales; markings blackish, obscure; a suffused streak beneath costa, from base to middle; a streak on fold from base to cell; a spot at end of cell; a mark in middle of cell; a suffused spot on inner margin near base; an interrupted streak along termen, edged posteriorly by fuscous-reddish; cilia greyish, mixed with blackish scales. Hindwings elongate-ovate, fuscous; cilia greyish, becoming dark fuscous at base.

Broken Hill, New South Wales; three specimens in May.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

XXIX.

[Read October 1, 1901.]

CARABIDÆ.

GIGADEMA.

It is extremely difficult to identify the species of this genus that have been described in the section that have the disc of the pronotum smooth or at any rate non-punctulate. The difficulty arises chiefly from the insufficiency of the descriptions,—more particularly their reliance upon prothoracic characters (which vary sexually as well as specifically) in most cases without note of the sex of the specimen referred to. Signor Gestro furnished some valuable notes and numerous figures relating to the species of De Castelnau's collection but I am afraid his figures are not reliable (Ann. Mus. Gen., 1875). His figure of the prothorax of *G. longipenne*, Germ. (sex not specified, but it is evidently the female), makes that segment scarcely wider than long (as seven to six), but the width of the prothorax in *longipenne* (female) is as seven to four and a quarter. I am quite confident as to my identification of this species as I have examples from Germar's locality, and I have no doubt either but that Gestro's notes refer to the true *longipenne*,—the fault is in the drawing of the figure. Ten species appertaining to this section of *Gigadema* have been described (disregarding *noctis*, Newm., which seems to be a mere name). Of these ten I myself described three and *longipenne*, Germ., is well known to me. *Bostocki*, Cast. (from W.A.), I have identified with tolerable certainty by the aid of Dr. Gestro's notes. The remaining five are from Eastern Australia (Queensland and N.S. Wales). I have before me two species from that region which, however, I am not able to identify with certainty, and also a species from Victoria which is not unlikely to be one of those described from N.S. Wales. *G. atrum*, Macl., is not before me; it is a very isolated species by the form of its palpi as well as by its sculpture and seems from the description unlikely to be a true *Gigadema*. One of my three species mentioned above (from N. Queensland) is almost certainly *grande*, Macl. (female,

the type appears from the description to have been a male, but my specimen agrees with Gestro's figure of the female); the other two are not unlikely to be two of *intermedia*, Gestro, *titanum*, Thoms., and *politulum*, Macl., but I cannot identify them confidently. I have also before me two species from Central and one from Western Australia which are all certainly undescribed, and of which I furnish descriptions below. I also furnish, below, a tabulation showing the prominent characters of all the species of this section of the genus (except *intermedium*, *titanum*, and *politulum*, which I am quite confident are not identical with any of the species characterised in the tabulation, but which I am not able to tabulate from the descriptions).

In this genus the form of the ligula is very diverse, but appears to be constant in individuals of the same species; at any rate it is constant in specimens of *G. longipenne*, Germ.,—the only *Gigadema* of which I have been able to examine a fairly long series,—and also in such few specimens as I have seen of other species. The form and proportions of the prothorax also furnish reliable specific characters so long as the fact is allowed for that in nearly (if not quite) all the species the *front outline* of that segment presents *sexual* characters. Further valuable assistance in the identification of species may be found in the puncturation of the elytra, which (so far as I can judge) is but little affected by sex. The sexes in this genus are not very readily determined by external characters; I do not find any constant sexual character on the ventral segments, and the anterior tarsi are scarcely dilated in the males; in some specimens however the front tarsi bear some sucker-like papillæ on their under surface, and I have assumed this to be a male character.

G. dux, sp. nov. Mas. Robustum; nigrum; capite inæquali, sparsim irregulariter sat fortiter punctulato; ligula pernitida puncturis paucis impressa, in parte mediana depressa, ad latera elevata (antice obtuse, postice sat anguste); prothorace quam longiori ut 10 ad 6 latiori, fere ut *G. longipenne*, Germ. maris conformato (*i.e.* laterum arcu, margine antico, et angulis similibus) sed lateribus ad basin magis parallelis (his in parte dimidia postica obtuse crenulatis), disco toto fortiter crebre transversim strigato; elytris striatis, interstitiis sat planis (7° nullo modo cariniformi) creberrime nec seriatim rugulosis (sed apicem versus interstitiorum externorum puncturæ nonnihil biseriatim impressæ apparent). Long., 17 l.; lat., $5\frac{1}{2}$ l.

A very large and deep black species. The non-seriate sculpture of its elytral interstices (except in the apical portion near the lateral margins) and the very strong close transverse wrinkling

of the disc of its pronotum at once separate it from all its described congeners.

W. Australia; sent to me by Mr. Jung.

G. longius, sp. nov. Fem. Minus robustum; piceum; capite minus inæquali sat crebre subfortiter punctulato, pone oculos haud tumido; ligula in parte mediana depressa sat opace coriacea et sat crebre punctulata, ad latera elevata (antice obtuse, postice sat anguste) obsolete sat crebre punctulata, partibus elevatis quoque grosse seriatim punctulatis; prothorace quam longiori ut 10 ad 7 latiori, fere ut *G. longipennis*, Germ. maris conformato (sed marginis antici parte mediana paullo magis prominenti), lateribus totis crebre acute crenulatis, disco leviter transversim rugato (partibus ceteris sat grosse,—quam *G. longipennis*, Germ., multo magis fortiter,—punctulatis); elytris striatis, interstitiis subplanis (7° leviter carinato) biseriatim subtilius (4°, 6°, 8°, 9° que vix seriatim, quam cetera magis crebre) punctulatis. Long., 18 l.; lat., 6 l.

Not unlike *G. longipennis*, Germ., but very much larger, the ligula totally different, the sides of the head not tumid behind the eyes, the sides of the prothorax strongly crenulate, the puncturation of the head and pronotum much stronger, the interstices of the elytra flatter, and their puncturation though scarcely finer decidedly closer,—especially on the fourth, sixth, eighth, and ninth interstices.

Central Australia (McDonnell Ranges).

G. longicolle, sp. nov. Fem. Minus robustum; piceum; capite minus inæquali sat crebre subfortiter punctulato, pone oculos vix tumido; ligula fere ut præcedentis (*G. longioris*), sed in parte mediana minus crebre punctulata; prothorace quam longiori ut 10 ad $7\frac{3}{4}$ latiori, postice sat fortiter angustato, sat fortiter subcrebre punctulato (disco lævi excepto), lateribus sat fortiter arcuatis minus fortiter sinuatis in parte postica dimidia leviter crenulatis, margine antico in medio modice prominenti, angulis anticis rotundatis posticis leviter obtusis; elytris striatis, interstitiis sat planis (7° manifeste carinato excepto) regulariter sat fortiter biseriatim punctulatis. Long., 17 l.; lat., 6 l.

The prothorax of this species is notably less strongly transverse than that of any other *Gigadema* known to me and its sides are less strongly sinuate in approaching the base. The punctures of the elytral interstices are as strong as in the species which I take to be *G. Bostocki*, Cast., but they are placed more regularly in rows and considerably more closely than in that species.

Central Australia (Oodnadatta).

TABULATION.

A. Disc of pronotum smooth or transversely strigate (not punctured).
B Ligula strongly convex ... ... *longipennis*, Germ.
BB. Ligula not of uniformly convex form.
C. Ligula extremely nitid and punctureless, except having a few distant punctures ... *rugaticolle*, Blackb.
CC. Ligula not like that of *rugaticolle*.
D. Seventh interstice of elytra not carinate.
E. Sides of head strongly tumid behind the eyes ... ... *eremita*, Blackb.
EE. Sides of head not tumid behind the eyes ... ... *dux*, Blackb.
DD. Seventh interstice of elytra carinate,—at least near the base.
E. The interstices become near apex convex and very closely punctured *grande*, Macl. (?).
EE. The interstices not as in *grande (?)*.
F. More than two rows of punctures on fourth and sixth interstices .. *longius*, Blackb.
FF. Interstices four and six with only two rows of punctures.
G. Prothorax strongly transverse.
H. Puncturation of interstices normal (about as in *longipennis*) . *mandibularis*, Blackb.
HH. Puncturation of interstices much more sparse and strong *Bostocki*, Cast. (?).
GG. Prothorax notably less strongly transverse... ... ... *longicolle*, Blackb.
AA. Disc of pronotum closely and rugulosely punctured ... ... *sulcatum*, Macl., and others forming a distinct section of the genus.

N.B.—The following described species are omitted from the above tabulation owing to uncertainty in my identification of them, viz., *G. intermedium*, Gestro, *politulum*, Macl., and *titanum*, Thoms.

XANTHOPHŒA.

X. concinna, sp. nov. Elongata; sat nitida; rufo-testacea, elytris pallidioribus singulis vittis binis nigris (altera suturali, altera submarginali) integris ornatis; oculis modicis, crebre minus leviter granulatis; prothorace quam longiori ut $2\frac{1}{3}$ ad 2 latiori, supra transversim subfortiter strigato et leviter punctulato, parte marginali late deplanata et leviter recurva, lateribus leviter arcuatis postice modice sinuatis, angulis posticis acutis sat fortiter extrorsum directis; elytris striatis, interstitiis sat planis minus crebre punctulatis (3ª postice punctura setigera unica impresso). Long., 4 l.; lat., $1\frac{2}{5}$ l.

The sutural vitta of the elytra covers the sutural and second interstices; the lateral vitta covers the sixth, seventh, and eighth interstices on each elytron all the vittæ are entire and very sharply defined.

Differs from *X. grandis*, Chaud, and *suturata*, Newm., by the much stronger and closer granulation of its eyes. From the other (except possibly several which are unknown to me but are certainly quite distinct) species having the sides of the pronotum widely dilated it is readily distinguished by (in combination) its fifth elytral interstice devoid of setigerous punctures, its third elytral interstice with only one setigerous puncture, and its elytral interstices not particularly closely punctured (much less closely than in *X. vittata*, Dej.).

N.S. Wales (Blue Mountains).

X. cylindricollis, sp. nov. Elongata, angusta (quam latior fere quater longior), sat convexa; nitida; glabra; rufa, elytrorum apice antennis pedibusque dilutioribus; capite pone oculos fortiter tumido; oculis magnis, vix manifeste granulatis; prothorace quam caput manifeste angustiori, quam latiori ut 4 ad 3 longiori, subcylindrico, postice quam antice vix latiori, fere lævi, longitudinaliter profunde canaliculato, canali integro), parte laterali minus late sulcata, lateribus ante medium leviter arcuatis pone medium leviter sinuatis, angulis posticis minus acutis leviter extrorsum directis; elytris profunde striatis, striis crenulatis, interstitiis convexis subtiliter sparsissime punctulatis (3° puncturas setigeras 3 ferenti). Long., 3 l.; lat., $\frac{4}{5}$ l. (vix).

It is with some hesitation that I refer this species to *Xanthophœa*. It certainly does not look congeneric with *X. grandis*, *vittata*, and their allies. But it is much more like (in respect of facies) the species that Chaudoir placed in *Xanthophœa* under the name *ferruginea*, with which it might well be congeneric. However, as Mr. Sloane has recently proposed an arrangement of the Australian genera of *Lebiides* (Pr. L.S., N.S.W., 1898) which seems to me satisfactory (at any rate provisionally) and intelligible, that for me settles the matter, and I think it well for workers on Australian *Carabidæ* to follow as much as possible his definitions of genera and so leave him a free hand to improve his work himself if in some instances he should find that his generic definitions are of too wide a character. Mr. Sloane's essential characters for *Xanthophœa* are "4th joint of tarsi bilobed, antennæ inserted considerably in front of the eyes, tarsi setose on the upper surface," all of which are characters of the present species. He includes in *Xanthophœa* all the Australian species that have hitherto been referred to *Demetrias*.

The nearest ally known to me of this species is the insect discussed below under the name *X. (Demetrias) longicollis*, Macl., from which it differs *inter alia* by its narrower and more convex form, longer prothorax, and especially the well-marked dilatation (behind the eyes) of the sides of its head. The last-mentioned

character *inter alia* also distinguishes this species from *X. (Demetrias) tweedensis*, Blackb., and *X. (Cymindis) rufescens*, Macl., to both of which it is allied.

N. Queensland ; sent to me by Mr. Koebele.

X. (*Cymindis*) *longicollis*, Macl. I have received from Mr. Lea some specimens of an insect from Northern N.S Wales which the sender says are *C. longicollis*, Macl., Mr. Lea appears to have compared them with Macleay's type and therefore I suppose his determination may be accepted (Macleay's description is quite useless). The species sent by Mr. Lea is the same that I have regarded as *X. ferruginea*, Chaud., and which I still believe to be that insect ; if it be so, Chaudoir's name must be dropped in favor of the name *Xanthophœa longicollis*, Macl.

X. (*Demetrias*) *rufescens*, Macl. I have examples from Cairns (Macleay's locality) of an insect which agrees well with the description of this species except in its elytral interstices (not "without punctures" but) under a strong lens showing some fine and very sparse puncturation. I have no doubt of its being *X. rufescens* but I am not satisfied that it is distinct from *X. longicollis*. Its elytral interstices are certainly less strongly convex (especially near the lateral margins) than those of *longicollis*, but I cannot find other characters to distinguish it.

TRIGONOTHOPS.

In Proc. L.S., N.S.W., 1892, pp. 65 and 66, I furnished some notes in which I drew attention to the difficulty of distinguishing *T. longiplaga*, Chaud, from *T. pacifica*, Er. Since the publication of those notes I have collected both species in the localities where the types were taken, and have found that they are certainly distinguishable by their sexual characters, but I cannot distinguish them otherwise. The male of the species which I take to be *longiplaga* has its front tarsi strongly dilated and four setigerous punctures on its apical ventral segment ; the male of *pacifica* has front tarsi much less dilated, and only two setigerous punctures on its apical ventral segment. Usually the anterior pale spot reaches the front margin of the elytra in *longiplaga ;* it very rarely does so in *pacifica* but there are exceptions in both species. The "vars. ?" *lindensis* and *occidentalis* which I referred to *pacifica* may possibly be vars. of *longiplaga*,—or even distinct species,—as they are females, and I cannot find any character to differentiate the females. I have not seen a male of *pacifica* except from Tasmania or of *longiplaga* except from Victoria.

T. fluvofasciata, Chaud. This species is distinguishable from *T. pacifica*, Er., and *longiplaga*, Chaud, by its wider prothorax and its elytral interstices considerably more distinctly punctured. The lateral dilatation of the anterior pale space on its elytra is

rarely wanting. So far as I can judge it is never present in *pacifica* or *longiplaga*. In Pr. L.S., N.S.W. (*loc. cit.*), I expressed doubt as to the validity of this species but the further examination of additional specimens has dispelled my doubts. Its male has front tarsi only feebly dilated and only two setigerous punctures on the apical ventral segment.

ECTROMA.

In Pr. L.S., N.S.W., 1889, p. 710, I proposed this name for certain species allied to *Sarothrocrepis* which the Baron de Chaudoir had stated were in his opinion distinct from that genus. I regard *Dromius civica* as the type of *Ectroma* and it was on that insect that the characters distinguishing *Ectroma* from *Sarothrocrepis* were specified. I am not sure that the three other species which de Chaudoir considered congeneric with *civica* are really so, nor am I certain that I know them all (two at least of them are quite insufficiently described). If I am right in my identification of them—and I think I can hardly be mistaken in one at least (*Lebia benefica*, Newm.)—their sexual characters are slightly different (the intermediate tarsi in the male being feebly dilated) but they agree with *D. civica*, Newm, in what I regard as the essential distinction of *Ectroma* from *Sarothrocrepis*—viz., the form of the apical joint of the labial palpi, which is in *Sarothrocrepis* compressed and at the apex wide and truncate, while in *Ectroma* it is more slender and at the apex attenuate (though very narrowly truncate at the extreme apex). There are a number of Australian species in my opinion best placed at present in *Ectroma* which differ a little *inter se* in respect of structural characters and which may possibly call for the creation of several new generic names eventually. Their structural differences consist chiefly in sexual characters and in the form of the fourth joint of the tarsi. In most of them the fourth joint of the tarsi is (as in *civicum*, Newm.) bilobed on all the tarsi; in one species (described below) the fourth joint is alike on all the tarsi but is not actually bilobed (it is dilated and the claw joint is inserted on the upper surface near the base, but the apex viewed from beneath is not or but slightly emarginate); in two other species (described below) the fourth joint of the front and middle tarsi is bilobed while that of the hind tarsi is simple. The following are the leading characters which I regard as in combination distinguishing *Ectroma* from allied genera:—The fourth joint of at least the front and middle tarsi dilated and having the fifth joint inserted near its base (its apex not, or more or less strongly, emarginate), claws pectinate, upper surface of tarsi not setose, base of antennæ not far distant from the eyes, apical joint of labial palpi more or less slender and towards its apex attenuate, body not pubescent.

The following names appear to have been given by the earlier authors to insects that I should refer to *Ectroma*, viz.,—*Dromius tridens*, Newm., *Lebia benefica*, Newm., *L. Duponti*, Putz., and *Cymindis inquinata*, Er. I regard the first three of these as representing but one species which must stand as *Ectroma tridens*, Newm. In Proc. L.S., N.S.W., 1892, p. 67, I conjectured that *D. tridens* might be the same as *Trigonothops pacifica*, Er., with the description of which its description such as it is agrees decidedly better than it does with the description of *Lebia benefica*, Newm.; nevertheless de Chaudoir states confidently (Berl. Ent. Zeit., 1873, p. 54),—possibly on an actual inspection of the type,—that *D. tridens* is congeneric with *L. benefica*, Newm. (which he certainly would not have stated if it had been a *Trigonothops* and if he had the type before him), and moreover I have (since I wrote my note on *D. tridens*) received from Mr. A. Simson a specimen stated to be on the authority of M. Putzeys named *D. tridens* which is certainly an *Ectroma* and in my opinion conspecific with *E.* (*Lebia*) *benefica*, Newm. These two items of evidence are no doubt strong, and in deference to them it seems best to regard *Dromius tridens* (until further evidence is forthcoming) as an *Ectroma* badly described by its author and as identical with *Lebia benefica*, Newm. I cannot, however, leave the subject without adding the remarks that Newman is hardly likely to have described the same insect as a *Dromius* and as a *Lebia;* and that the facies of *Dromius* (to which Newman attributed his *tridens*) is very much more that of *Trigonothops* than of *Ectroma*, while the facies of *Lebia* is much more that of *Ectroma*.

As regards *Lebia Duponti*, Putz., de Chaudoir states (I have no doubt correctly) that it is identical with *L. benefica*, Newm. Concerning *Cymindis inquinata*, Er., de Chaudoir states that it is congeneric with *L. benefica* and the description reads like that of a possible variety of that species (which is common in Tasmania,—Erickson's locality for *inquinata*), but as I have not seen a specimen exactly agreeing with the description of *inquinata* it is better for me to consider it probably a good species.

Of subsequently described species the following seem likely to be referable to *Ectroma* though placed in different genera. It seems well to mention them here for the guidance of future describers, although their descriptions are not of a kind to indicate their generic position and I conjecture them to belong to *Ectroma* chiefly by the notes of their size and style of markings. They are *Trigonothops ornata*, Macl. (which must be very like *E. benefica*, Newm.) and *Sarothrocrepis liturata*, Macl., *notata*, Macl., *notabilis*, Macl., and *fasciata*, Macl. They are all from N.W. Australia except *fasciata* which is from Queensland.

I may add that two species described by me as of this genus (*obsoletum* and *parvicolle*) are only doubtfully referable to it, their antennæ being inserted at a greater distance from the eyes than those of typical species. I should have been disposed to place them in *Trigonothops* were it not that one of them (*obsoletum*) has the fourth joint of its tarsi not truly bifid (though appearing so when viewed from the upper side) and that in the other the position of the antennæ seems really intermediate between its position in those two genera while its facies is much more that of *Ectroma* than of *Trigonothops*. Perhaps in reality they ought to be considered as representing two new genera,—one of which may be *Eulebia* (a genus unknown to me and not recognisably diagnosed).

It is further to be noted that it is just possible I may in the following descriptions re-name some of Macleay's species mentioned above, the descriptions of which are merely brief indications of color and markings,—but as none of my species agree satisfactorily with those indications and are all from localities very distant from those quoted by Macleay I do not think identity probable.

E. elegans, sp. nov. Mas. Testaceum, prothoracis parte mediana late ferruginea, elytris macula magna communi nigro-fusca ornatis (hac reversa arborem simulanti, ad basin sicut ad striam 5^{am} utrinque extenditur dilatata, parte frondem simulanti ad striam 7^{am} utrinque et ad partem apicalem 8^{am} extensa, in parte dilatata basali utrinque macula parva subscutellari testacea notata); oculis subtiliter nullo modo obsolete (fere ut *E. beneficæ*, Newm.) granulatis; antennis mox ante oculos insertis; capite coriaceo subopaco parum convexo; prothorace quam longiori ut 2 ad $1\frac{1}{5}$ latiori, antice quam postice manifeste angustiori, canaliculato, coriaceo, subopaco, lateribus sat fortiter rotundatis nullo modo sinuatis, latitudine majori vix ante medium sita, angulis posticis obtusis nullo modo reflexis, basi bisinuata vix lobata; elytris nitidis, striatis, interstitiis antice subconvexis postice planis; tarsorum omnium articulo 4° subtus producto ad apicem vix emarginato, supra fere ad basin concavo; articulo 5° prope 4^{i} basin inserto; unguiculis pectinatis. Long., $2\frac{3}{4}$ l.; lat., $1\frac{1}{5}$ l.

The common dark blotch on the elytra (viewed with the head of the insect towards the observer) resembles the figure of a tree, with the basal part of the trunk greatly dilated and the upper outline of the foliage serrate.

Victoria.

E. inquinata, Er. I have before me specimens from Western and South-Western Australia which appear to me distinct from

E. benefica, Newm., though undoubtedly closely allied to it. Structurally they differ by their coriaceous subopaque head and pronotum and the evidently greater length of the basal joint (as compared with the second) of their hind tarsi. The pattern of their elytra differs by the absence of a humeral dark mark and the dark mark behind the middle not being produced forward on the suture. I should have no hesitation in describing this insect as a new species were it not for the possibility of its being a variety of *E. (Cymindis) inquinata*, Er.,—having the external discal dark mark attributed to that species confluent with the post-median blotch.

E. grave, sp. nov. Testaceum, elytris macula basali (hac in interstitio 4° sita) macula humerali et macula communi post-mediana (hac marginem lateralem attingenti, antrorsum in sutura et ad marginem lateralem late breviter producta, apicem fere attingenti) fusco-nigris ornatis; capitis forma antennarum insertione et oculorum granulis ut præcedentis (*E. elegantis*); prothorace quam longiori ut $1\frac{1}{2}$ ad 1 latiori, antice parum angustato, canaliculato, ut caput subtiliter coriaceo subopaco, lateribus leviter arcuatis pone medium subsinuatis, angulis posticis obtusis (sed fere rectis) manifeste reflexis, basi media late leviter lobata, latitudine majori sat longe ante medium sita; elytris sat nitidis, striatis, interstitiis antice sat manifeste postice vix convexis; tarsorum anticorum 4 articulo 4° bilobo, posticorum hoc articulo simplici perbreve (quam articulus 3us duplo breviori); unguiculis pectinatis. Long., $2\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l. (vix).

At once separable from the preceding two species by the fourth joint of the hind tarsi being simple. The post-median common dark blotch on the elytra extends from margin to margin, occupying about the front two-thirds of the hind half of the elytra, and is feebly produced forward at its extremities and on the suture; its hind margin is not far from straight. The front and middle tarsi are feebly dilated in the male. It is just possibly identical with *Sarothrocrepis Mastersi*, Macl. (from Queensland), of which the entire description is as follows:—"Length, 3 l. This species, though much smaller, looks very like *Lebia posticalis*, Guer. It is however of rather a paler hue, and the black fascia on the elytra is larger."

Victoria and Tasmania.

E fasciata, Macl. (?). I have before me specimens which may appertain to this species. They are from Queensland, Central Australia, and North-west Australia, and therefore likely in respect of their habitat to be Macleay's insect. The description of it is as follows:—"Length, 2 l. Like the last (*Sarothrocrepis*

pallida) but much smaller, and with a broad black fascia on the hinder part of the elytra which is prolonged along the suture towards the apex." The description of *S. pallida* is a similar comparison of that species with *S. Mastersi*, and the description of *S. Mastersi* (as noted above) a similarly brief comparison with *S. posticalis*. There is not much in the above to assist identification, but I remember seeing the type of *fasciata* some years ago at Sydney and recognise the present species as at any rate considerably resembling it. The species that I therefore call "*E. fasciata*, Macl (?)" is entirely testaceous except some fuscous coloring (not always present) along the front of the pronotum and the sides of the abdomen, and on the elytra a dark subbasal spot on either side near the scutellum and a dark marking behind the middle the form of which is difficult to describe; the second interstice is dark from the middle for about two thirds of its distance thence towards the apex, the third and fourth interstices are dark from about the beginning of the apical one-third of their length to about the beginning of the apical one-fourth, the fifth interstice is dark on a still smaller space, and the sixth interstice is dark from about the middle of its length for about one-half its distance thence to the apex; the first interstice is slightly infuscate on the part corresponding to that which is dark fuscous on the second interstice. Thus the dark portions of the interstices form a kind of common fascia extending from the sixth interstice on one elytron to the same on the other elytron, which fascia is strongly trifid on its front margin and jaggedly arcuate on its hind margin. The above markings scarcely vary in the dozen specimens that are before me. The granulation of the eyes, insertion of antennæ and coriaceous subopacity of the pronotom do not seem to differ much from the same in the preceding species. The prothorax is wider than in the allied species, its width being to its length almost as one and two-thirds to one. The striation and interstices of its elytra are not noticeably different from the same in *grave*. The tarsi very closely resemble those of *grave*, with the exception that the fourth joint of the hind pair is notably longer, being quite distinctly more than one-half the length of the preceding joint. I possess besides the specimens described above two examples of an *Ectroma* from South-west Australia (Eucla) which I take to represent a variety of the same insect as I can find no difference except in the markings of the elytra which are almost exactly as in the species that I have (above) called "*E. inquinata*, Er. (?)." Of the two forms this latter (from Eucla) seems to agree more exactly than the other with Macleay's quasi-description.

It is perhaps possible that the insect described above is that

which in his paper on the *Carabidæ* of West Australia (P.L.S., N.S.W., p. 499, 1898) Mr. Sloane has called *E. beneficum*, Newm. I have not seen the true *beneficum* from West Australia.

E. fragile, sp. nov. Testaceum, elytris macula basali (hac in interstitio 4° sita) et notulis brevibus linearibus in interstitiis 2° 4° 6° que sitis sicut ut notulæ arcum interruptum communem formant (hoc ab elytrorum longitudinis medio retrorsum directo) fuscis ornatis, abdominis segmentis prope latera et apicem fusco-notatis, nonnullorum exemplorum notulis fuscis nonnullis carentibus; capitis forma antennarum insertione et oculorum granulis fere ut *E. elegantis;* prothorace quam longiori ut $1\frac{1}{2}$ ad 1 latiori, antice parum angustato, canaliculato, cum capite subtiliter coriaceo subopaco, lateribus modice arcuatis pone medium vix subsinuatis, angulis posticis obtusis quam *E. gravis* minus reflexis, basi media late leviter lobata, latitudine majori sat longe ante medium sita; elytrorum striis interstitiisque fere ut *E. gravis;* tarsis ut *E. fasciata*, Macl. (?) (ut supra descriptum est). Long., $2\frac{1}{5}$ l.; lat., $1\frac{1}{10}$ l.

This species is of somewhat fragile depressed appearance as compared with its allies. It can be readily distinguished from all the others described above except *E. fasciata*, Macl. (?) by the structure of its hind tarsi, from the last-named species by its very much less transverse prothorax as well as by its different elytral markings.

South Australia (Sleaford Bay).

The following is a tabulation showing the characters of the species known to me of *Ectroma*.

A. Head considerably longer than in the following species ... ... *parvicolle*, Blackb.
AA. Head notably shorter.
B. None of the tarsi have the fourth joint simple.
C. Apex of the elytra dark ... ... *civicum*, Newm.
CC. Apex of the elytra pale.
D. Joint 4 of the tarsi strongly dilated and at apex not emarginate ... ... *obsoletum*, Blackb.
DD. Joint 4 of the tarsi less dilated, and at apex emarginate (in some species feebly).
E. Sides of prothorax strongly and evenly rounded, not at all sinuate ... ... *elegans*, Blackb.
EE. Sides of prothorax neither strongly nor evenly rounded.
F. Pronotum nitid, not coriaceous ... *tridens*, Newm.(?) / *beneficum*, Newm.
FF. Pronotum subopaque, coriaceous ... *inquinata*, Er.(?)
BB. Joint 4 of hind tarsi simple.
C. This joint extremely short ... ... *grave*, Blackb.
CC. This joint notably longer.
D. Prothorax very strongly transverse ... *fasciata*, Macl.(?)
DD. Prothorax much less transverse ... *fragile*, Blackb.

D. collaris, sp. nov. Sat elongatus; sat nitidus; glaber; rufo-brunneus, elytris circa scutellum et latera versus infuscatis; capite parvo; prothorace quam longiori ut 6 ad 5 latiori, antice quam postice sat angustiori, longitudinaliter profunde canaliculato, lateribus late explanatis (fere ut *Xanthophœæ vittatæ*, Dej.) pone medium subsinuatis, angulis posticis bene determinatis sed fortiter (quam *D. australis*, Er., multo magis fortiter) obtusis; elytris striatis, interstitiis leviter convexis (3° bipunctato) coriaceis. Long., 4 l.; lat., $1\frac{1}{2}$ l.

The insect described above seems to be certainly congeneric with *D. australis*, Er., agreeing with it in the following characters:—Head not convex between the eyes, constricted (but obliquely narrowed) and transversely impressed behind the eyes; mentum with a median tooth; tarsi glabrous on upper surface (their fourth joint not bilobed); claws serrate; elytra glabrous. In all other respects likely to be generic it agrees with *D. australis*, Er., and has the facies of that species. It is readily distinguished from *D. australis inter alia* by its narrower prothorax which is widely explanate (somewhat as in *Xanthophœa vittata*, Dej.) on the sides.

Victoria.

D. pauper, sp. nov. Minus elongatus; subnitidus; glaber; rufo-brunneus, prothoracis disco et elytris (margine excepto) piceo-brunneis; capite sat magno; prothorace quam longiori ut 4 ad 3 latiori, antice quam postice vix angustiori, longitudinaliter sat fortiter canaliculato, lateribus ut *D. collaris* explanatis pone medium subfortiter sinuatis prope angulos anticos breviter ciliatis, angulis posticis rectis; elytris fortiter striatis, interstitiis subconvexis minus latis punctulatis. Long., 3 l.; lat., $1\frac{1}{2}$ l.

This species presents all the generic characters attributed (above) to *D. collaris*, nor can I find any other characters less indicative of generic agreement with *D. anstralis* unless the presence of a few fine short setæ fringing the front portion of the lateral edges of the prothorax can be regarded as such a one. It has stout antennæ and short stout tarsi (the fourth joint of the latter emarginate, though by no means bilobed) exactly like those of *D. australis*, Er., excepting that the tarsi of the hind legs—as is also the case with *D. collaris*—are a little less stout. It is at once distinguishable from its two described congeners by *inter alia* the narrower more convex and quite strongly punctulate interstices of its elytral striæ.

Tasmania.

The following species is a member of this genus according to Mr. Sloane's definition of it in his remarks on the *Lebiides* in Proc. L.S., N.S.W., 1898. It has all the structural characters that I have quoted above as distinctive of *Diabaticus* with the exception that its head is abruptly (not obliquely) narrowed behind the eyes, which Mr. Sloane says is the case with species that he places in *Phlœocarabus*. It is to be noted, however, that De Chaudoir proposed a new generic name (*Notoxena*) for one of those species—in Mr. Sloane's opinion incorrectly. The fact is that the genera of the *Lebiides* (as Mr. Sloane points out, quoting Dr. Horn in confirmation) are in a very serious state of confusion; and there are not a few genera—*Phlœocarabus* included—to which it is not in my opinion wise to refer any species without specifying the characters on which the reference is founded, to enable future authors when difficulties are cleared up, to determine the proper place of such species. The following species is certainly, I think, identical generically with the insect that Mr. Sloane calls *Phlœocarabus* (*Trigonothops*, Macl.; *Notoxena*, Chaud.); *nigricollis*, Macl., from which I do not find it to differ structurally in any respect except that its head is a little shorter and its tarsi are more slender.

P. Farinæ, sp. nov. Glaber; testaceus, capite prothoraceque rufescentibus, in elytris regione scutellari, sutura (apice summo excepto) et fascia postmediana piceis, hac postice serrata; oculis leviter nec subtiliter manifeste granulatis; prothorace sat fortiter transverso, supra transversim subtiliter rugato, longitudinaliter canaliculato, ad latera late explanato, antice parum emarginato, lateribus pone medium sinuatis, angulis posticis acute rectis, basi media sat fortiter lobata; elytris coriaceis, striatis, interstitiis leviter convexis, 3° punctoris 3 instructis (punctura postica ad apicem summum posita); tarsis sat gracilibus. Long., 2—2½ l.; lat., ⅘—1 l.

The width of the post-median fascia and the size of the scutellar blotch in one of my two specimens are considerably greater than in the other. This evidence of variability renders it impossible to specify any difference between this species and *P. nigricollis*, Macl., in respect of color and markings except that the head and prothorax are bright rufo-testaceous in this species. Compared with *P. nigricollis* this species apart from color has an almost similar pronotum which however is a little less explanate laterally and has hind angles a trifle sharper; the sculpture of its elytra is scarcely different, perhaps a trifle less deep. The much smaller size, the shorter head and the consider-

ably more slender tarsi, however, furnish very satisfactory distinctions.

Central Australia (Farina, at light).

TAROMORPHA.

Mr. Sloane (*loc. cit.*) includes this among the genera unknown to him, which consequently he cannot place in his tabulation of *Lebiini*. Its place in his tabulation is beside *Coptoglossus* from which it differs by its mentum devoid of a median tooth.

SILPHOMORPHA.

S. rufoguttata, Blackb. This species—described by me Tr. R. Soc., S.A., 1893, p. 295—was wrongly referred to *Silphomorpha*, being a member of the allied genus *Adelotopus*. I carelessly overlooked the fact that its eyes are margined externally. It must be very like *A. bimaculatus*, Macl., and may be identical with it. The diagnosis of that insect is too brief (consisting of nine words) for confident identification but such as it is it fits my specimen. The diagnosis however is followed by the additional (the only additional) information, "This species is narrower than the last" (*A. apicalis*). My insect is much *less* narrow than that which I have regarded as being *A. apicalis*, Macl., and in fact is wider than any other *Adelotopus* known to me—which, no doubt, was the cause of my calling it a *Silphomorpha* without sufficient study of its characters. It is uncertain therefore whether the name *rufoguttata* can stand as representing a species distinct from *bimaculata*, Macl.

CLIVINA.

C. eyrensis, Blackb. I suspect this species of being identical with *C denticollis*, Sloane. When (at the time I described it) I compared it with Mr. Sloane's descriptions and referred it to his "*obliquata* group," I held it to be a member of the section of that group in which the elytral striæ are not "simple," and so did not consider the question of its being *denticollis* which forms the other section In revising the nomenclature of my *Clivinæ* I have noticed the satisfactory agreement of this species with the description of *denticollis* in all respects except the puncturation of its elytral striæ, and observing that those impressions are certainly only *very feebly* punctured and bearing in mind that the distinctness of puncturation is not a very reliable character in the *Scaritides*, I deem it probable that the name *eyrensis*, Blackb., must become a synonym of *denticollis*, Sloane.

HARPALUS.

H. promtus, Er. I have already (Pr. L.S., N.S.W., 1890, p. 557) noted the occurrence of an insect agreeing well with the description of *H. promtus* in South Australia. It agrees so well

with the description that I consider nothing wanting to assure the identification except the inspection of specimens from Tasmania. Since my former note was written I have found it on the Victorian mountains. De Chaudoir referred *H. promtus* to *Bradycellus*. The species before me, however, is certainly congeneric with those which Mr. Sloane has referred to the genus *Euthenarus* (on comparison with New Zealand specimens) which was founded by Bates for some *Harpalidæ* from New Zealand allied to *Bradycellus*. The species that I have before me differs from the other two described Australian *Euthenari* by *inter alia* the sharply rectangular hind corners of its prothorax.

HAPLANER.

H. insulicola, sp. nov. Robustus; modice elongatus; nitidus; piceus, palpis pedibus antennarum basi et elytrorum lateribus postice testaceis, nonnullorum exemplorum pronoto et corpore subtus obscure rufescentibus; capite sat magno, antice utrinque impresso; prothorace sat fortiter transverso, supra lævi, subtiliter canaliculato, postice utrinque impresso, basi quam margo anticus vix latiori, lateribus modice arcuatis, latitudine majori ante medium sita, angulis anticis haud productis posticis obtusis; elytris postice ad latera haud distincte sinuatis, profunde striatis, striis externis (9ª et 8ªe parte postica exceptis) et ceterarum (1ª 2ª que exceptis) parte postica obsoletis, striarum interstitiis fortiter convexis, stria basali brevi fere nullo.

Maris quam feminæ statura sat brevior est. Long., $2\frac{1}{2}$—3 l.; lat., 1--$1\frac{1}{10}$ l.

This species is evidently congeneric with *H. velox*, Cast., agreeing with it in the non-dilated tarsi of its male, the absence of defined lateral elytral striæ, and the almost non-sinuate lateral margin of the elytra. It differs from *velox inter alia* by the four inner striæ of the elytra being very much more deeply impressed and having their interstices quite strongly convex, and by the eighth elytral stria running forward into the front one-fourth of the elytra where it coalesces with the ninth stria.

Thursday Island; given to me by Captain Bourke, R.N.

H. velox, Cast. Mr. Sloane (P.L.S., N.S.W., 1898, p. 460) expresses a doubt as to the occurrence of this species near Melbourne. I have it from that locality and also from S. Australia.

N.B.—I do not know the derivation (and the consequent gender) of the name *Haplaner*. Is it a misprint for *Haplanes?* I see Mr. Sloane calls it "Harplaner" but that is not Chaudoir's name nor is it more intelligible than *Haplaner*.

NOTOPHILUS.

N. lætus, Blackb. I have specimens from tropical Queensland (sent to me by the late Mr. Cowley, of Cairns) which I am unable to separate from this South Australian species.

LECANOMERUS.

L. obscurus, Blackb. This species (described in Tr. Roy. Soc., S.A., 1887, p. 189) is a form of *Stenolophus (Harpalus) dingo*, Cast., and the name must sink into a synonym of the latter species. I may say that in my opinion this insect cannot rightly be associated with the European *Stenolophi*, from which it differs widely in the form of the fourth joint of its tarsi, &c.; it seems to require a new generic name, as it differs from *Lecanomerus* and other *Harpalid* genera of Australia in the shape of its mandibles and other characters. As, however, Mr. Sloane is at present working as an able specialist on the Australian *Carabidæ*, I shal' leave the matter for his treatment.

L. (*Diaphoromerus*) *victoriensis*, Blackb. In P.L.S., N.S.W., 1890, p. 777, I explained my reasons for calling this insect, with much hesitation, a *Diaphoromerus* Mr. Sloane has recently (*l.c.*, 1898, p. 464) traversed this reference in favor of *Lecanomerus*. I take this opportunity of saying that I concur in his remarks.

THENAROTES.

T. metallicus, Blackb. This species would be better placed in *Notophilus*.

T. minor, Blackb. I named this (Tr. R.S., S A., 1887, p. 185) as doubtfully a variety of *T. discoidalis*, Blackb. A recent examination of it however points to its being a good species as, apart from color differences, I find that the basal foveæ of the pronotum are separated from the lateral margin by a slightly convex unpunctured space, whereas in *T. discoidalis* they are continuous to the lateral margin.

T. discoidalis, Blackb. This species is very near *Trechus atriceps*, Macl., which (as I have already noted, Tr. R.S., S.A., 1895, p. 28) is a *Thenarotes*. I think it distinct, however, as the smallest specimen I have seen is notably larger than *T. atriceps*, and the sides of its prothorax are very evidently less strongly rounded.

LESTIGNATHUS.

L. minor, Blackb. This species must be removed to the closely allied genus *Hormacrus* recently (P.L.S., N.S.W., 1898, p. 488) founded by Mr. Sloane.

LACORDAIRIA.

Mr. Sloane (*loc. cit.*, *p* 487) expresses the opinion that this genus and a number of others that have hitherto been attributed to widely different groups of *Carabidæ* ought to be associated together and placed among the *Licinides*. In this I think he is right. I cannot, however, follow him in the opinion that *L. anchomenoides*, Cast., *argutoroides*, Cast., and *marginata*, Cast., ought to be attributed to the genus *Microferonia*. I

think he bases this reference on the episterna of the metasternum being in those species narrower than in *L. proxima*, Cast., which he regards as a typical *Lacordairia* (probably correctly, although I do not know *L. cychroides*, Cast., which is I presume the real type, and Mr. Sloane seems to imply that he has not seen it either). For my part I do not find the diversity in the episterna of the species mentioned above at all of a kind that would suggest generic diversity to me, and certainly the species are extremely like each other in facies. But however that may be it appears to me that the episterna of the least closely allied of them all are far less distinct *inter se* than they all are from the episterna of *Microferonia*, which moreover is very different from them all in facies. My own inclination is to leave them in *Lacordairia*, but if they are to be removed from it I think they ought to be formed into a new genus. Mr. Sloane in his tabulation of *Licinides* (*loc. cit.*, p. 188) makes two aggregates of genera having the episterna respectively "quadrate (short)" and "decidedly longer than broad." I feel no hesitation whatever in referring all the species of *Lacordairia* mentioned above to the former aggregate and no hesitation in referring *Microferonia* to the latter. I do not feel much doubt as to the correctness of my indentification of the species mentioned (I collected the specimens on the Victorian mountains—Castelnau's locality), except in the case of *L. argutoroides*, my single (supposed) example of which is much darker in color than the description indicates and which moreover certainly presents some structural differences from the other three, but not in the direction of *Microferonia*.

L. angustata, Cast. I have a specimen (taken by myself on the Blue Mountains—Castelnan's locality) of an insect which I cannot doubt is this species, as it agrees perfectly with the description. It, however, is a *Siagonyx* (having the intercoxal projection of the prosternum strongly margined behind, &c.), and is closely allied to *S. amplipennis*, Macl. (my identification of which has been confirmed by Mr. Sloane), but it differs from Macleay's species *inter alia* by its prothorax being very much narrower and its labrum so deeply bisinuate that the middle part stands out as a strong projection.

TRECHUS.

The Australian species that I attribute to *Trechus* differ considerably *inter se* in facies, none of them, moreover, bearing much resemblance to any European species known to me. Their characters of a kind likely to be generic are very uniform however excepting perhaps those of *T. baldiensis* in which the recurved elytral striole is very near the margin—practically wanting—and *T. Tasmaniæ* whose comparatively stout antennæ and

short stout palpi (which nevertheless are of the *Trechus* type) suggest a doubt whether it might not suitably receive a new generic name. Until there is reason to believe that most of the Australian *Trechides* are known it seems to me best to attribute to *Trechus* all the species presenting the following characters (and not differing from *Trechus* by any other obviously generic peculiarity), viz :—Anterior tarsi of male with the basal two joints (only) dilated ; antennæ with only the basal joint less pubescent than the other joints ; apical joint of palpi of normal length and of elongate-conic form (pointed at apex) ; frontal sulci of head arched, and continued hindward towards (or behind) the hind margin of the eyes.

The number of Australian species that have been attributed to *Trechus* is, I believe, eleven. Four of these were described by Sir W. Macleay and could not be identified from the descriptions. I have, however, seen the types, all of which are from Queensland. I have already (Proc. L.S , N.S.W., 1892, p. 97) reported that three of them belong to other genera than *Trechus* while the other (*concolor*) I could not feel confident about, the specimen being a female and material for comparison with other species not being at hand ; it did not, however, seem to me to be a *Trechus*. Of the remaining seven I have before me types or co-types of all except one—*T. nitens*, Putz. That species is probably near my *T. Tasmaniæ*, but it is evidently not identical as it is described as having all its elytral striæ distinct except the seventh and the base of the prothorax very little more than half as wide as the the front. The following table will indicate characters by which the already named species of *Trechus* may be distinguished—those attributed to *T. nitens* being founded on the description only.

A. Prothorax not narrower at base than on front margin.
  B. Elytra fully striate.
    C. Interstices of elytral striæ very strongly convex near apex ... ... *Victoriæ*, Blackb.
    CC. Interstices of elytral striæ not or but little convex.
      D. Prothorax strongly transverse ... ... *diemenensis*, Bates.
      DD. Prothorax very slightly transverse ... *subornatellus*, Blackb.
  BB. Elytra with seventh and eighth striæ not, or scarcely, traceable.
    C. The elytral striæ strongly punctulate ... *baldiensis*, Blackb.
    CC. The elytral striæ non-punctulate ... *solidior*, Blackb.
AA. Prothorax distinctly narrower at base than on front margin.
  B. Elytra fully striate ... ... *Simsoni*, Blackb.
  BB. Elytra with only the seventh stria wanting *nitens*, Putz.
  BBB. Elytra with only the three or four inner striæ distinct ... ... *Tasmaniæ*, Blackb.

T. subornatellus, sp. nov. Minus elongatus ; subovatus ; sat convexus ; sat nitidus ; piceo-niger, palpis antennarum basi

pedibus et elytrorum fascia postmediana maculari maculisque nonnullis subapicalibus testaceis; capite parvo, sulcis frontalibus profundis fortiter arcuatis; oculis minus convexis; prothorace quam longiori ut 5 ad $3\frac{1}{2}$ latiori, antice quam postice angustiori, longitudinaliter sat profunde canaliculato, quam elytra multo angustiori, lateribus parum arcuatis postice haud sinuatis, angulis posticis acute subrectis, foveis basalibus sat profundis, basi media retrorsum leviter convexa; elytris striatis (omnibus bene impressis), interstitiis nonnihil convexis (3° puncturis 3 setiferis instructo. Long., $1\frac{3}{5}$ l.; lat., $\frac{4}{5}$ l. (vix).

Readily distinguishable by the conspicuous tertaceous spots on its elytra most of which are placed so as to form an irregular common fascia somewhat behind the middle of the length of the elytra; also by its small head and narrow prothorax, the latter having its sides less arcuate than is usual in the Australian *Trechi*.

Victoria (Fernshaw).

T. solidior, sp. nov. Minus elongatus; subovatus; sat convexus; robustior; sat nitidus; piceo-niger, ore palpis antennis pedibus elytrorumque marginibus (his anguste) rufo-testaceis; capite modico, sulcis frontalibus profundis fortiter arcuatis; oculis minus convexis; prothorace quam longiori fere sesquilatiori, antice quam postice sat angustiori, longitudinaliter sat profunde canaliculato, quam elytra sat angustiori, lateribus modice arcuatis postice parum sinuatis, angulis posticis leviter obtusis bene determinatis, foveis basalibus magnis leviter impressis coriaceis, basi media retrorsum leviter convexa; elytris striatis, striis subsuturalibus profunde (externis gradatim minus profunde, 7° 8° que vix manifeste) impressis, interstitiis subplanatis (3° puncturis 3 setiferis instructo). Long., 2 l.; lat., $\frac{4}{5}$ l.

Near *T. diemenensis*, Bates, from which *inter alia* it is readily distinguishable by the external two striæ of its elytra being all but effaced—scarcely traceable. Resembles *Lecanomerus* in facies.

Victoria (Alpine district).

T. Tasmaniæ, sp. nov. Modice elongatus; subovatus; sat convexus; nitidus; niger, palpis mandibulis antennis basin versus pedibusque rufescentibus; capite modico, sulcis frontalibus profundis fortiter arcuatis; palpis brevibus; oculis minus convexis; prothorace quam longiori ut 3 ad 2 latiori, postice quam antice paullo angustiori, longitudinaliter canaliculato, lateribus sat fortiter arcuatis postice nullo modo sinuatis, latitudine majori sat longe ante medium sita

angulis posticis valde obtusis (fere subrotundatis), foveis basalibus modicis, basi latissime leviter lobata; elytris striatis, striis subsuturalibus profunde (externis gradatim minus profunde, 5°—8° vix vel haud manifeste) impressis, interstitiis sat planis (3° puncturis magnis 3 setiferis instructo). Long., $1\frac{3}{5}$ l.; lat., $\frac{3}{5}$ l.

A *Bembidium*-like species, also resembling *Trechodes gibbipennis* in facies, but with very different palpi, non-gibbous elytra, &c. The basal part of the prothorax is of peculiar shape, its lateral portion almost continuing the line of the lateral outline of the segment for a short distance so that it seems to consist of a very wide and very short lobe.

Tasmania (on a mountain in the Lake District).

TRECHODES (gen. nov. *Trechidarum*).

Mentum dente acuto instructum; ligula setifera (?); palporum articulus ultimus subfiliformis quam præcedens parum brevior (fere ut *Perilepti*); labrum transversum ciliatum; caput supra utrinque fortiter arcuatim sulcatum; antennæ elongatæ, articulo basali glabro; tarsi elongati, maris anticorum articulis basalibus 2 dilatatis; corpus convexum, glabrum; elytra (striis subsuturali et marginali exceptis) haud striata.

T. (*Bembidium*) *secalioides*, Blackb.

It is necessary to found a new genus for the reception of *Bembidium secalioides*, Blackb., which I attributed doubtfully to *Bembidium* (Proc. L.S., N.S.W., 1890, p. 786), remarking that it might eventually have to be so treated. In spite of its *Bembidium*-like facies I find that it is in reality allied to *Trechus*, The palpi having their apical joint elongate (as in *Perileptus*) and the frontal sulci of the head being strongly arched as in *Trechus*. Unfortunately I have not a specimen for dissection, so that a satisfactory examination of the ligula is not practicable but I can see that it is setiferous and I think it is considerably shorter than its paraglossæ. The form of its palpi associate this genus with *Perileptus* from which however its elongate tarsi, strongly convex form, and very different facies, readily separate it. *Bembidium bipartitum*, Macl., is likely to be a member of this genus.

T. gibbipennis, sp. nov. Sat convexus; glaber; nitidus; niger; antennis pedibusque nonnihil picescentibus; capite supra utrinque fortiter arcuatim sulcato, sulcis pone oculos continuis; prothorace quam longiori vix latiori, subglobulo, longitudinaliter leviter canaliculato, tenuissime marginato, supra lævi (puncturis nonnullis in sulco transverso subbasali positis exceptis), utrinque fovea in lobo basali pone angulos

posticos impresso, his minutis subdentiformibus, lobo basali latissimo valde elongato ; elytris striis singulis subsuturalibus et marginalibus profunde impressis (illis antice abbreviatis), alibi nullo modo striatis, sulco profundo transverso discoidali paullo pone basin instructis, ante hunc sulcum gibbosis, punctura magna discoidali mox pone medium aliaque minore anteapicali impressis ; tarsis minus elongatis. Long., $1\frac{1}{5}$ l.; lat, $\frac{2}{5}$ l.

This extraordinary little insect is certainly I think allied to *T. secalioides*, Blackb., though it is quite possible that the discovery of additional species may result in its being convenient to separate it generically under a new name. The two seem rightly associated as a distinct group of *Trechides* having the palpi of *Perileptus* (like those of *Bembidium* except that the apical joint is greatly elongated), but with the convex form of a *Bembidium* and the elytra brilliantly nitid and (except the very deep subsutural and marginal striæ) without a trace of striation. In the present species the large anterior discal elytral puncture of *secalioides* is replaced by a deep transverse sulcus in front of which the elytra are gibbous. The possibly generic distinctive characters of this species as compared with *secalioides* consist in its evidently shorter tarsi (especially the hind pair) and antennæ, the excessively fine marginal edging of its prothorax and the curious basal lobe of the latter, the lateral outline of which so nearly continues the outline of the true lateral margin of the segment that to a casual inspection the hind angles appear as small denticulations of the margin placed at a distance from the base equal to about a quarter of the length of the whole segment. The superficial characters of this insect are so remarkable that there can be no difficulty in recognising it whatever may be thought of its generic position.

Tasmania (on a mountain in the Lake District).

TACHYS.

Mr. Sloane (Proc. L.S., N.S.W., 1896, III.) has furnished a very valuable memoir "on the Australian *Bembidiides* referable to *Tachys*," &c. *Tachys* is a genus particularly difficult to define as no one character can be specified distinguishing it from *Bembidium*. Lacordaire makes it a section of *Bembidium*. Dr. Schaum treats it as a good genus and limits it to species having both a recurved elytral striole and anterior tibiæ obliquely truncate at the apex. There exist numerous species in which it is difficult to say whether there is a true elytral striole,—that character being either very faint or the striole being confused with one of the systematic striæ. The absence of the striole is in some species accompanied by the presence of the tibial charac-

ter in the most exaggerated form ; on the other hand there are species in which the tibial character is very faintly defined,—some in which it is difficult to determine whether their tibiæ place them in *Bembidium* or *Tachys*. Mr. Sloane has defined *Tachys* on the tibial character alone and has admitted into the genus species in which the elytral striole is decidedly wanting. It is to be noted that he has adopted this definition with great diffidence, and has distinctly stated that it does not satisfy his ideas of desirable generic grouping in the *Subulipalpi*, being adopted provisionally. I think that he is quite right in exercising great care to avoid the formation of genera which the future discovery of additional species is likely to invalidate, and that where a describer deems a new species before him likely to be subsequently proved (by the finding of intermediate forms) to be merely an aberrant race of some known genus it is better to refer it to that genus—at the same time specifying clearly the characters which render its position doubtful. I am not therefore prepared to challenge Mr. Sloane's action in this matter or his opinion that a more satisfactory grouping of Australian *Bembidiides* is attained by separating the species having the tibiæ characteristic of *Tachys* from those having them of the typical *Bembidium* form irrespective of their elytral sculpture, than by making the elytral sculpture of importance as a generic character. In fact Mr. Sloane has concentrated attention on the *Carabidæ* so much more than I have done, and I so generally agree with his conclusions, that I am much disposed to yield to his authority. It seems, however, desirable that I should make these remarks because my own contributions to the descriptions of Australian *Bembidiides* have followed a different line and I have given as much prominence to elytral as to tibial sculpture in generic apportionment, not however relying absolutely upon either and in the case of species where those characters were not both of them of either the *Tachys* or the *Bembidium* type adding the consideration of facies so that one of my species (as noted below) has not been placed by me as Mr. Sloane would now place it.

T. (*Bembidium*) *victoriensis*, Blackb. This species was placed by me in *Bembidium* with the remark that although having the tibiæ of a *Tachys* it has elytral sculpture inconsistent with a place in that genus. Its facies being decidedly more accordant with *Bembidium* than with a typical *Tachys* I apportioned it to the former genus. On Mr. Sloane's conception of *Tachys*, however, it must stand in that genus rather than in *Bembidium*. In Mr. Sloane's tabulation of Australian species of *Tachys* its place is with *T. brunnipennis*, Macl., and *ectromioides*, Sloane, from both of which it differs by its elytra being fully and very deeply striate and having their interstices strongly convex.

T. similis, Blackb. When I described this insect I omitted to remark on (and, indeed, to notice) its close resemblance to the European *T. scutellaris*, Germ.; I scarcely know how to separate it from that species by any other character than the much shorter and feebler frontal sulci of the head,—a distinction, however, sufficiently strongly marked to form a perfectly satisfactory specific difference.

T. Adelaidæ, Blackb. A comparison of this species with examples of *T. transveraicollis*, Macl. (compared with the type by Mr. Sloane) has satisfied me that the two names are founded on one insect. Sir W. Macleay's description is quite insufficient to have indicated this identity. Sir W. Macleay's name has priority.

CILLENUM.

C. (*Bembidium*) *Mastersi*, Sloane. This insect (described by Mr. Sloane as a *Bembidium*) is extremely close to the European *C. laterale*, Sam. Its coloring scarcely differs, but it is of decidedly more elongate form and has evidently longer and less stout antennæ. The genus *Cillenum* has not been previously recorded as Australian.

BEMBIDIUM.

The Australian species of *Bembidium* have been reduced to small numbers by Mr. Sloane, with whose conclusions I cordially agree subject to the slight doubt expressed above as to his treatment of the distinction between *Tachys* and *Bembidium*. I have (above) removed from *Bembidium* two more species that he had left in it, which leaves in it ten species (three of them from Queensland, named by Macleay,—two of these practically undescribed,—unknown to Mr. Sloane or to myself). One of them (*B. bipartitum*, Macl.) I have conjectured (above) to be a *Trechodes*, but at any rate it is not a *Bembidium* as the apical joint of its palpi is described as elongate. *B. amplipenne*, Macl., and *sexstriatum*, Macl., if true *Bembidia* are certainly I think distinct from all of the genus that have been described by other authors. There thus remain only seven Australian species (including the two described below) that can be confidently referred to *Bembidium*. I have the types or thoroughly authentic specimens of all of them before me. Their distinctive characters may be tabulated as follows :—

A. Pronotum widely margined, the hind angles strongly explanate ... ... *Jacksoniense*, Guér.

AA. Pronotum not as above.

B. Elytra fully striate or seriate-punctulate.

C. Head scarcely convex longitudinally in the middle between the eyes ... ... *Riverinæ*, Sloane.

CC. Head strongly convex longitudinally in the middle between the eyes.

D. Elytra with a conspicuous (but not sharply limited) depression a little behind base .	*dubium*, Blackb.
DD. Elytra without the sub-basal depression.	
E. The seventh elytral stria strongly defined	*proprium*, Blackb.
EE. The seventh elytral stria subobsolete ...	*Hobarti*, Blackb.
BB. The six inner striæ (only) of the elytra present	*errans*, Blackb.
BBB. The five inner striæ (only) of the elytra present	*wattsense*, Blackb.

B. Hobarti, sp. nov. Subovatum ; minus convexum ; sat nitidum ; nigricans, antennarum basi mandibulis pedibusque rufescentibus ; capite utrinque profunde sat recte sulcatum ; prothorace quam longiori circiter sesquilatiori, antice quam postice multo latiori, longitudinaliter canaliculato, utrinque ad basin minus profunde impresso, lateribus antice fortiter rotundatis postice breviter rectis anguste marginatis, angulis posticis minutis sat rectis, latitudine majori ante medium sita, parte basali transversim depressa, basi fere recta ; elytris fortiter punctulato-striatis (stria 6ª quam præcedentes minus fortiter impressa, 7ª fere nulla, 8ª margini fere contigua), interstitiis manifeste convexis, striola recurva haud plane carenti ; tibiis anticis ad apicem latis, supra vix manifeste oblique truncatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{1}{2}$ l.

This is a species that illustrates the difficulty of distinguishing *Tachys* and *Bembidium*. It has an irregular sulcus near the apex of the elytra which is somewhat of the nature of a recurved striole and the extreme apical part of the upper outline of its front tibiæ seems from a certain point of view obliquely truncate, although it would be equally correct to say that the apical outline of the tibiæ (*i.e.*, the line joining the upper and lower outline of the tibiæ) is a curve. I do not think that Mr. Sloane would place the insect in *Tachys* as having the upper outline of the tibiæ genuinely obliquely truncate at the apex. It is not very near any other *Bembidium* known to me. The seventh stria of its elytra is extremely slight but is distinctly traceable under a lens as a row of fine punctures, so that this species must be ranked among those having fully striate elytra. The two discal punctures of the third elytral interstice are small and inconspicuous, the sub-apical puncture more distinct.

Tasmania (near Hobart).

B. wattsense, sp. nov. Ovale ; subelongatum ; sat convexum ; nitidum ; nigrum, antennarum basi mandibulis tibiis tarsisque rufescentibus ; capite utrinque profunde sat recte sulcatum ; prothorace quam longiori haud plane sesquilatiori, antice quam postice multo latiori, longitudinaliter canaliculato, utrinque ad basin sat profunde impresso, lateribus antice fortiter rotundatis postice rectis anguste marginatis, angulis posticis rectis, latitudine majori ante medium sita,

parte basali transversim depressa, basi fere recta; elytris punctulato-striatis, striis 6ª 7ª que omnino carentibus, interstitiis sat planis (3ª puncturis setiferis 3 modicis impresso), striola recurva haud plane carenti; tibiis anticis ad apicem latis, supra vix manifeste oblique truncatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{1}{2}$ l. (vix).

Rather close to the preceding (*B. Hobarti*) but narrower and more convex, the prothorax more decidedly cordiform with the basal impressions much better defined, the elytra less deeply striate with the stiæ much more distinctly punctulate, the sixth and seventh striæ quite wanting (not even represented by punctures). In the typical specimen the third and fourth elytral striæ are abbreviated in front at the front setiferous puncture of the third interstice where they meet (it being placed at the edge of the third interstice and the fourth striæ bending over to it). This may be an accident of the individual as I find a somewhat similar arrangement of striæ on one (but not on the other) elytron of *B. Hobarti.*

Victoria (Dividing Range; on bank of the Watts River).

DYTISCIDÆ.

ANTIPORUS.

A. (Hydroporus) collaris, Hope. I have before me a male (from Port Darwin) and two females (from King's Sound) which there is little doubt appertain to this species. The Rev. H. Clark (Journ. Ent. I., p. 412) quotes Westwood for the presence of four abbreviated stria-like lines very faintly impressed on each elytron. On the elytron of the females before me there are faint traces of four lines (only visible from a certain point of view, and so faint as to be hardly worthy of mention) but I cannot find them in the male. As in all other respects (especially in the remarkable pronotum) these insects agree perfectly with the description of *A. collaris* I feel no doubt as to the identification, although the four lines are less distinct than one would expect from even the phrase "very faintly impressed." This view of the matter is confirmed by one of my specimens being from Port Darwin, which is near Port Essington (Hope's locality). Mr. Masters in his Catalogue has placed *H. collaris*, Hope, in the genus *Antiporus;* I cannot find any published note suggesting that place for it, but nevertheless *Antiporus* seems to me of existing genera that in which *H. collaris* should stand, as its hind tibiæ are punctured as in that genus and its epipleuræ are distinctly broad in the posterior part (quite as broad as in *A. Blakei*, Clk.). Nevertheless I am of opinion that if Dr. Sharp had had my specimens under inspection when he wrote his great work on

the *Dytiscidæ* (in which he states that he can give no information about *H. collaris*) he would have formed a distinct genus for them. I am not in a position to do so myself as I have not made a sufficiently special study of the *Dytiscidæ* to enable me to furnish a satisfactory diagnosis without treating a male example in a manner that my unique male would not bear, and therefore I shall leave the species in *Antiporus* remarking however that it differs from all those which Dr. Sharp placed in that genus in respect of the sculpture of its pronotum (the lateral margins being very widely thickened and raised, with a sulcus or deep stria separating the marginal from the discal portion) and in respect of its sexual characters. The front tibiæ of the male have an external median tooth similar to, but a little smaller than, the tooth on the middle tibiæ of *A. Blakei*; the front tarsi are somewhat feebly dilated and a little longer than those of the female; my specimen has lost one each of the front and middle tarsi, on the remaining ones I can find but one claw, though I am suspicious of a claw having been broken off the middle tarsus. The front tarsus seems to have its claw springing directly from the apex of the third joint as though the basal part of the claw joint were wanting, but it is quite possible that that appearance would be found to be deceptive if a fresh specimen whose tarsi would bear manipulation could be examined. The posterior tibiæ and all the femora are unarmed. In one of the specimens mentioned above the base of the pronotum is rufous at the sides, which suggests the idea of identity with *H. gravidus*, Clk. (also described from Port Essington) and I feel no doubt that *H. undecim-maculatus*, Clk., is closely allied, if not a variety of the same species.

NECTEROSOMA.

N. costipenne, Lea. This insect is no doubt identical with *H. penicillatus*, Clk., one of the commonest and most widely distributed as well as most variable of the Australian water beetles. Dr. Sharp, in his work on the *Dytiscidæ* of the world, includes under the name forms with and without elytral carinæ, in which I have no doubt he is right as I find that the forms with strongly carinate, and those with non-carinate, elytra are connected by forms in which the elytral carinæ are more or less feeble. Even if the carinate forms represent a species distinct from the non-carinate ones, however, it was the carinate form that Clark described under the name *Hydroporus penicillatus* and therefore the non-carinate form, if either, is the one that would need a new name.

PLATYNECTES.

P. subænescens, Lea. Mr. Lea has been good enough to send me a specimen of this insect. He distinguishes it from *ænescens*,

Shp., only by its less metallic tone of coloring and the absence of a testaceous spot on its elytra. The size he assigns to it is slightly larger than that Dr. Sharp mentions as the size of *ænescens*. Presumably Mr. Lea has, since the time when he described *P. subænescens*, taken additional specimens, as the example sent to me (from Beverley, W.A.) has a testaceous spot on each elytron similar to that of *ænescens*. Hence the differences mentioned are reduced to somewhat larger size and less distinctly æneous coloring. Nevertheless, if my specimen of *ænescens* is rightly named (as I think it is), I take Mr. Lea's species to be a valid one as it is (my specimens of both are females) of considerably different form, having more rounded sides and being distinctly less blunt at the hind apex. *P. subænescens* belongs to Dr. Sharp's first group of *Platynectes*, and is very distinct from all its described Australian congeners except *ænescens*.

GYRINIDÆ.

MACROGYRUS.

M. fortissimus, sp. nov. Fem. Late ovalis; minus convexus; nitidus; supra nigroæneus vix cuprascens; subtus piceus, palpis pedibus abdomineque obscure rufescentibus; supra subtilissime coriaceus; elytris striolis minimis transversis subtilissime impressis, obsoletissime regulariter striatis, interstitiis vix manifeste (alternis quam cetera nonnihil magis distincte) convexis, ad apicem leviter dehiscentibus late subtruncatis, angulis externo bene definito sed nullo modo acuto (mediano nullo) suturali subrotundato; tibiis anticis apicem versus modice latis, angulo externo apicali obtuso sed extrorsum manifeste prominentibus; pygidio sat dense fulvo-pubescenti. Long., $8\frac{1}{4}$ l.; lat., $4\frac{2}{5}$.

A large species (not smaller than *M. rivularis*, Clk.), at once distinguishable from all its described Australian congeners except *M. Howitti*, Clk., by the absence of longitudinal elytral sulci. It differs from the description of *M. Howitti*, *inter alia*, by its large size, its extremely wide form, the absence of metallic blue and green coloring from its lateral margins and the presence of quite distinct (though very faint) striæ on its elytra. Compared with specimens (females) from Tasmania which agree well with the description of *M. Howitti* the present species differs (apart from the distinctions noted above) by the finer and closer transverse striolation of its elytra and by the striolæ appearing very closely and finely zigzagged,—an appearance that seems (under a very strong lens) to be caused by the presence of minute punctures interrupting their outline. The elytral quasi-striæ are nine in number, and the external striæ are scarcely more distinct than those near the suture. The apex of the elytra

should perhaps be designated "doubly truncate, with the two truncate faces meeting in an extremely obtuse and non-prominent angle."

N.S. Wales (Blue Mountains).

M. opacior, sp. nov. Fem. Ovalis; minus latus; depressus; in elytris sat opacus; nigro-piceus, palpis pedibusque dilutioribus, elytris suturam versus manifeste rufescentibus; supra subtilissime coriaceus; elytris striolis et lineis subtilibus elevatis brevibus transversis instructis, in parte laterali sulcis 4 profunde impressis (in parte altera vix manifeste striatis), ad apicem dehiscentibus et ut *M. rivularis*, Clk, sinuatis; tibiis anticis ad apicem extus fere recte angulatis. Long., 6 l.; lat., $2\frac{1}{2}$ l.

Readily distinguishable from all its described Australian allies by its opaque reddish-brown elytra. It agrees with *M. rivularis*, Clk., and *M. latior*, Clk., in the sinuate apical outline of its elytra; differing from the former *inter alia* by its much smaller size and from both in its elytra having only four sulci in their lateral portion and scarcely any trace (even close to the base) of any striæ between the sulci and the suture. On the anterior portion of its elytra very fine short elevated lines take the place of the impressed striolæ usual in the genus.

Victoria (Mt. Macedon); sent by Mr. Kershaw.

M. paradoxus, Regimb. See note (below) on *Dineutes Gouldi*, Hope.

M. (*Gyrinus*) *obliquatus*, Aubé. In Mr. Masters' Catalogue this species is said to be widely distributed in Australia. Aubé quotes it as common to Australia and the "Iles de la Sonde." Regimbart in his Monograph of the *Gyrinidæ* gives "Timor" as its habitat. I have examined a large number of *Gyrinidæ* from different parts of Australia, but have not seen any which agree with the description of *obliquatus* and consider that further evidence is required to establish the occurrence in Australia of that insect.

DINEUTES.

D. Gouldi, Hope. I have before me examples from N. Australia (one of them from Port Darwin, near the original locality) which I believe, in spite of certain discrepancy with the description, to be this species, the coloring, size, &c., being sufficiently notable to make it improbable that two species from the same locality would agree in respect of them. The obstacle to considering this identification certain is that the description calls the elytra "*trispinosa*" and adds the information that the median spine is larger than the two lateral ones,—whereas in the insect before me each elytron has only *two* spines. In one example I

observe that the elytra including their sutural spines are closely in contact with each other at the apex and might be regarded at a casual glance as having three spines on the conjoined elytra (the two sutural spines appearing as one). Although I must admit that Hope's Latin diagnosis (the lateral spines being called "*bini*") *strictly* implies six spines on the two elytra, I cannot help thinking that Hope used the word "*bini*" instead of "*duo*" carelessly and that his "*trispinosa*" refers to the fact that the two conjoined elytra present the appearance of being (together) trispinose. Otherwise it is certainly remarkable if in the one locality there are two species agreeing in general characters that render them particularly distinct among their allies of the same family yet differing in the armature of their elytral apices. I have both sexes of this insect before me. It is further to be noted that this insect is not a true *Dineutes* but a *Macrogyrus* and is certainly, I think, *M. paradoxus*, Regimb., of which M. Regimbart remarks that in general appearance "it resembles a *Dineutes* much more than a *Macrogyrus*." Unless Hope's type is in existence I do not see much prospect of the identity of *D. Gouldi* being conclusively determined. If some Coleopterist in England could ascertain whether the type is in the Oxford University Museum and if so send me a description or figure of tho outline of the apical portion of its elytra and also report as to whether the specimen has a distinct scutellum I should greatly value the information.

D. australis, Fab., and *rufipes*, Fab. I suspect that as far as Australian specimens are concerned these names refer to but one species, which is widely distributed in Central and Northern Australia. I notice that *D. australis* is attributod to the East Indies as well as to Australia and it may well be that the two *species* are distinct but that *australis* nevertheless has been incorrectly quoted as Australian. Unfortunately I am not able to refer to all the literature bearing upon the question, but the descriptions before me (including those of Fabricius) seem to me as if they might have been founded on only one species. I should be very glad if anyone could throw any fresh light upon this subject.

PALPICORNES.

HYDROPHILUS.

H. scissipalpis, sp. nov. Modice latus, postice sat obtusus; nitidus; piceo-niger, antennis palpisque testaceis, pedibus anticis totis femoribus 4 posterioribus et abdominis maculis lateralibus rufis, tarsis fulvo-ciliatis; prothorace brevi, cum capite ut *H. albipedis*, Cast., et *H. latipalpi*, Cast., punctulato, lateribus leviter arcuatis, angulis posticis rotundatis, basi utrinque latera versus rotundatim retrorsum dilatata;

scutello lævi; elytris triseriatim punctulatis, prope apicem haud seriebus additis impressis; lamina prosternali postice concava; carina sternali postice sat acuta, vix pone coxas posticas producta; sterno breviter pubescenti.

Maris palporum maxillarium articulo penultimo apicem versus intus leviter compresso-dilatato, paullo ante apicem subito angulatim angustato; tarsorum anticorum articulo apicali subtus laminato-dilatato; unguibus anticis modice robustis, minus arcuatis, externo quam internus fere duplo longiori.

Feminæ palpis tarsisque simplicibus. Long., 13—15 l.; lat., 6—6½ l.

This species differs from the previously described Australian *Hydrophili* as follows: from *gayndahensis*, Macl., by its very much shorter sternal carina; from *brevispina*, Fairm., by the very different front claws of the male, different colors, &c.; from *albipes*, Cast., by the much less numerous rows of punctures on its elytra near the apex, the differently shaped penultimate joint of the male palpi, the very much greater inequality of the front claws of the male, the basal outline of the prothorax, the evidently more rounded basal angles of the prothorax, &c.; from *latipalpus*, Cast., by the much less numerous rows of punctures on its elytra near the apex, the extremely different male characters, the colors, &c. *H. ruficornis*, Klug, is unknown to me in nature and is insufficiently described by its author, but from Fairemaire's remarks on it in the Journ. Mus. Godeff, p. 80, that species evidently has a very much longer sternal carina and apparently its prosternal lamina is not concave posteriorly.

Central Australia.

H. gayndahensis, Macl. This species is practically undescribed, —the quasi-description merely stating that its sternal carina passes the extremities of its hind femora, and that its palpi tarsi and fringing hairs are reddish. There is nothing in this to distinguish it from *H. ruficornis*, Klug.

HISTERIDÆ.

CHLAMYDOPSIS.

C. comata, sp. nov. Nitida; nigro-picea, antennis pedibus elytrisque (his piceo-umbratis) castaneis; capite grosse granuloso-ruguloso; prothorace transverso, supra ad latera late explanato et alte reflexo, haud punctulato, ante basin utrinque longitudinaliter profunde strigato; elytris lævibus, humeris ut processus cornua magna simulantes (his ad apicem penicillam pilorum aureorum valde elongatorum ferentibus) productis, lateribus pone humeros ut cristæ magnæ (his antice penicillam ut humeri ferentibus) elevatis; propygidio pygidioque sat fortiter punctulatis; pedibus minus elongatis. Long., 1½ l.; lat., 1⅕ l.

This species is evidently congeneric with those that I have previously described under the generic name *Chlamydopsis*. It is distinguishable from all the species hitherto attributed to that genus by, *inter alia*, its extremely nitid and punctureless elytra as well as by the extraordinary humeral horn and lateral crest that project from each elytron and the thick pencil of very long golden hairs (nearly long enough to reach back to the propygidium) that rise from the apex of the humeral process and the front of the summit of the lateral crest. A single specimen was found in a pool of water.

South Australia (near Woodville).

BUPRESTIDÆ.

MELOBASIS.

M. interstitialis, sp. nov. Minus nitida; supra viridi-ænea, prothoracis angulis posticis scutelloque purpureis, elytrorum costis interrupte aureo-cupreis; subtus purpureo-cuprea; pedibus anticis viridi-æneis posterioribus obscure subpurpureis, tarsorum articulo ultimo viridi; antennis obscuris; corpore subtus ad latera pedibusque albo-pilosis; capite (fere ut *M. cupreo-vittatæ*, Saund.) plano, confertim granuloso-punctulato, albido-piloso; prothorace quam longiori ut 5 ad $3\frac{1}{2}$ latiori, antice vix angustato, antice et postice fortiter sinuato, fere ut *M. cupreo-vittatæ* punctulato (sc. in disco sat crebre minus fortiter, ad latera grosse rugulose), lateribus subrectis (fere ut *M. Saundersi*, Mast.); elytris fere ut *M. Saundersi* 5-costatis, interstitiis (fere ut *M. Saundersi*) subtiliter confertim subæqualiter punctulatis sed quam hujus speciei puncturis magis concinnis, parte antica haud transversim strigata, lateribus postice sat crebre denticulatis, denticulo suturæ proximo quam ceteri majori; sterno sat longe pone marginem anticum transversim fere recte gibboso, parte mediana antice minus crebre minus fortiter (postice magis crebre magis fortiter) punctulato; segmentis ventralibus basalibus 2 crebre subtiliter (ceteris minus crebre) punctulatis.

Maris quam feminæ pronoti disco magis fortiter punctulato, segmento ventrali apicali postice bi-emarginato trispinoso.

Feminæ segmento ventrali apicali profunde sat anguste emarginato. Long., $7\frac{2}{3}$ l.; lat., $2\frac{1}{4}$ l.

The golden coppery parts of the elytral costæ are the front one-fifth of the first (sutural) costa, a short piece of the second costa slightly in front of its middle, of the third costa a short piece near the base and another behind the middle, of the fourth the hind extremity, and of the fifth a somewhat long piece near the front. This species is notable among those having costate

elytra by the remarkable form of its prosternum, which is transversely gibbous on a space well separated from the front; so that from a certain point of view there appears to be a kind of wheal running across the prosternum, distinctly separated from the front margin of the prosternum, and having its front straight and equally well-defined across the whole of the non-pilose part of the segment. The elytral costæ are more sharply defined than in any other *Melobasis* known to me (*e.g.*, the second being as strong as in *Saundersi*, Mast. (*costata*, Saund.) and the fifth (which is obsolete in *Saundersi*, scarcely marked in *cupreo-vittata*, Saund.) being quite well defined. The middle part of the basal ventral segment is very much more closely punctulate than in either of the species just named. The sides of the prothorax are as straight as in *Saundersi* but the segment is not (as it is in that species) narrowed towards the front.

Australia. Sent to me by Mr. French.

EUCNEMIDÆ.

DYSCHARACHTHIS.

D. brevipennis, Blackb. In describing this species (Tr. Roy. Soc., Vict., 1899, pp. 217, &c.) I omitted to say that it is found n South Australia (Basin of Lake Eyre).

CHRYSOMELIDÆ.

PAROPSIS.

In Proc. L S., N.S.W., 1899, p. 520) I expressed the opinion that *P. splendens*, W. S. Macleay, is not a *Paropsis* but should be referred to either *Cyclomela* or *Augomela*. I have since been informed by Mr. Masters that he has succeeded in finding the type specimen and that it is an *Augomela*.

A List of Birds Collected by the Writer in Western Australia during the Last Fortnight of August, 1901, with Notes Thereon.

By Edwin Ashby.

[Read October 1, 1901.]

(*The numbers in brackets supply the references to the species in "Gould's Handbook."*)

Ninox boobook, *Lath.* (Boobook Owl), [36].

Locality.—Bayswater, near Perth.

One male. The coloration is much darker than any specimen of this species I have seen in S.A. collections. The usual spotting is almost entirely absent, and the tail is not barred.

Cheramœca leucosterna, *Gld.* (White-breasted Swallow), [57].

Locality.—Kanowna, W.A.

Nine birds came out of one hole made in the side of the diggers' pits. Probably they had thus congregated together for warmth.

Artamus sordidus, *Lath.* (Dusky Wood Swallow), [73].

Locality.—Speakmans.

Pardalotus ornatus, *Temm.* (Striated Diamond Bird), [84].

Locality.—Speakmans Very numerous.

Strepera plumbea, *Gld.* (Leaden Crow Shrike).

Locality.—Speakmans.

Cracticus nigroqularis, *Gld*, (Black-throated Crow Shrike), [95].

Locality.—Speakmans. Numerous.

Cracticus destructor, *Temm.* (Collard Crow Shrike), [99].

Graucalus melanops, *Lath.* [Black-faced Graucalus), [103].

Pteropodocys phasianella, *Gld.* (Ground Graucalus), [108].

A flock of these birds were about the locality of Speakmans for one day—none noted afterwards. The notes of these birds are most striking, loud cries being uttered while the birds are flying. I did not observe them settle on the ground, once only in the Eucalyptus trees.

Pachycephala rufiventris, *Lath.* [116].

One female from Guilford, near Perth. This specimen differs in several minor details from any South Australian skins of *P. rufiventris*, Lath., I have been able to compare it with.

Colluricincla rufiventris, *Gld.* (Buff-bellied Shrike Thrush), [124].

Locality.—Speakmans.

The notes are similar to those of *C. harmonica*, but feeble, lacking richness and power.

Oreoica cristata, *Lewin* (Bell Bird), [131].

One of the commonest birds round Speakmans.

Rhipidura Preissi, *Cabani* (The Western Fantail), [134].

Locality.—Guilford, near Perth.

Micræca assimilis, *Gld.* (Allied Flycatcher), [150].

Locality —Speakmans.

Pseudogerygone culicivora, *Gld.* (Western Flycatcher), [157].

Locality.—Bayswater, near Perth.

Smicrornis brevirostris, *Gld.* (Short billed Smicrornis), [161].

One of the commonest birds at Speakmans. Usually about eight or more in a flock.

Petroica Leggi, *Sharpe* (Scarlet-breasted Robin), [165].

Locality.—Guilford, near Perth.

The white spot above the beak is quite as large in these specimens as in South Australian specimens. I have shot one specimen at Albany with a small white spot above the beak, the form described by Sharpe as *P. Campbelli.*

Petroica Goodenovii, *V.* and *H.* (Red-capped Robin), [166].

Locality.—Speakmans. Females were fairly numerous, but no males were seen.

Acanthiza tenuirostris, *Zietz.* (Small-billed Tit), [230a].

Locality.—Guilford, near Perth. The only previously-recorded specimens of this species are the two type specimens from Leigh's Creek, South Australia. This is, therefore, the first time it has been recorded from West Australia.

Acanthiza uropygialis, *Gld.* (Chestnut-rumped Tit), [222].

Locality.—Speakmans. This is, I believe, the first record for South-Western Australia.

Acanthiza pyrrhopygia, *Gld.* (Red-rumped Tit), [224]

Locality.—Fourteen miles east of Speakmans.

Geobasileus chrysorrhous, *Quoy* and *Gaim* (Yellow-rumped Tit), [229].

Locality.—Bayswater, near Perth.

Pyrrholœmus brunneus, *Gld.* (Red Throat), [235].

Very numerous at Speakmans.

Cinclosoma castaneonotum, *Gld.* (Chestnut-backed Ground Thrush), [272].

Locality.—Speakmans.

Pomatorhinus superciliosus, *V.* and *H.* (White Eye browed Pomatorhinus), [294].

Very common at Speakmans.

Glyciphila albifrons, *Gld.* (White-fronted Honey-eater), [302].

Locality.—Speakmans.

Glyciphila ocularis, *Gld.* (Brown Honey-eater), [304].

Locality.—Guilford, near Perth. One male. This skin is considerably more grey in plumage than is a skin I have from York, W.A., collected by myself in 1889. The York skin is decidedly more rufus in coloration, the under side of the head markedly so. The York skin is not sexed. The district is dry, while Perth is a wet district.

Ptilotis sonora, *Gld.* (Singing Honey-eater), [307].

Locality.—Fourteen miles east of Speakmans. I did not observe this species west of this point, although common east of that place.

Ptilotis leucotis, *Lath.* (White-eared Honey-eater), [311].

Locality. — Speakmans. The specimens collected in this locality are much smaller than those collected by me in the State of Victoria, also the black marking does not extend so far down the breast, but otherwise they are identical.

Ptilotis ornata, *Gld.* (Graceful Honey-eater), [314].

Locality.— Speakmans.

Ptilotis plumula, *Gld.* (Yellow-fronted Honey-eater), [315].

Locality.—Speakmans.

Acanthogenys rufigularis, *Gld.* (Spiny-cheeked Honey-eater), [329].

Locality.—Speakmans. Common, but very shy.

Anthochœra carunculata, *Lath.* (Wattled Honey-eater), [331].

Locality.—Guilford, near Perth.

Anellobia lunulata, *Gld.* (Lunated Wattle Bird), [333].

Locality.—Guilford, near Perth.

Acanthorhynchus superciliosus, *Gld.* (White Eye-browed Honey-eater), [340].

Locality.—Guilford, near Perth.

Melithreptus chloropsis, *Gld.* (Swan River Honey-eater), [350].

Locality.—Guilford, near Perth.

Myzantha obscura, *Gld.* (Sombre Minah), [354].

Locality.—Bayswater, near Perth.

Myzantha flavigula, *Gld.* (Yellow-throated Minah), [356].

Locality.—Speakmans. Numerous in the locality.

Zosterops Gouldi, *Bparte.* (Greenbacked Silver Eye), [361].
Locality.—Guilford, near Perth.

Climacteris erythrops, *Gld.* (Red Eye-browed Tree Creeper), [368].
Locality.—Speakmans.

Sittella pileata, *Gld.* (Black-capped Sittella), [376].
Locality.—Bayswater, near Perth.

Psephotus multicolor, *Temm.* (Varied Parrot), [430].
Locality.—Speakmans.

Platycercus semitorquatus, *Q.* and *G.* (Twenty-eight Parrot), were very numerous about Speakmans, and a pair of *Climacteris rufa* were seen at the same place. Several other species of birds were seen, but without handling their identification must be doubtful. I saw a skin of *Cacatua Leadbeateri*, Vig. (Pink Cockatoo), which was shot at Goongarrie. I also heard of the same species visiting the Soak, 14 miles due east of Speakmans.

Speakmans, sometimes known as Callion, is situated about 85 miles north of Coolgardie, and about 360 miles from the coast. Only five days were spent there, viz., 16th to 20th August, 1901. Most of the collecting was done at sunrise, as the days were otherwise fully occupied. As far as observation went, the birds had not commenced nesting, but some species appeared to have paired. This may be accounted for from the fact that the winter rains had been very light. Only one day was spent in the neighborhood of Perth, viz., 26th August.

Fossil Polyplacophora from Eocene Beds of Muddy Creek, Mornington (Schnapper Point) and Moorabool, Victoria, with Definitions of Nine New Species, and Notes on Others.

By Edwin Ashby and W. G. Torr, LL.D., &c.

[Read October 1, 1901.]

Plate IV.

The very valuable collection of Fossil Polyplacophora dealt with in this paper has been placed in our hands for description by the late Professor Ralph Tate, to whom belongs the honor of having brought together such an interesting series, the major part having been collected by himself and Mr. J. Dennant, of Victoria. One very interesting feature of this collection is the close affinity so many bear to living forms. The collection numbers in all 32 valves, comprising 17 or 18 species, and representing seven different genera. The whole collection is deposited in the University Museum, Adelaide.

1. Lorica compressa, *n. sp.* Pl. iv., fig. 6.

One example of median valve.

General Appearance.—Strongly carinated, side slope straight, color yellowish to dark-brown. The valves are produced forward in an anterior beak.

Lateral Area.—Much raised, ornamented with five, increasing to eight, at the insertion plates, granulose ridges. The granules near the girdle are arranged in transverse rows.

Pleural Area.—This area is longitudinally ribbed with 16 strong ridges, the interspaces are deep, the anterior portion is about the same width as the ridges, the posterior portion about double the width. There is a suggestion that the ridges were crossed by shallow transverse ridging.

Dorsal Area.—This area is not separated from the pleural, the longitudinal ridging being continued right over the jugum.

Measurement.—Greatest width between the slopes, 24 mm.; greatest width of slopes, 11 mm.; greatest length of slope, 18 mm The longitudinal measurement of the dorsal area is 12 mm.; divergence, 85°. The insertion plates and sutural laminæ are missing.

Remarks.—This species differs from *Lorica volvox* and *L. affinis* in the strong radial ribbing of the lateral areas and the great number of the longitudinal ribs in the pleural area, but it corresponds with *L. affinis* in the compression of the side slopes. The decussation of the interspaces present in *L. affinis* is absent in this species.

2. Lorica affinis, *n. sp.* Pl. iv., fig. 7.

One example of median valve.

General Appearance.—Carinated, side slope slightly curved, though almost straight, color pale yellowish-brown

Lateral Area.—Distinctly raised, ornamented with six radial rows of somewhat distant pustules which rise out of very shallow ridges.

Pleural Area.—Longitudinally ribbed with twelve narrow, but strong ridges; the interspaces are fully three times the width of the ribs, and nearly flat; these ridges have a slight tendency to granulation, but the transverse striæ which produce the same appearance in its congener, *Lorica volvox*, are not discernible in this species. The megalopores are very pronounced, giving under a powerful lense a strongly decussated appearance.

Measurement.—The greatest width between the slopes is 20 mm.; width of slopes, 10 mm; length of slopes, 15 mm.; divergence, 90°.

Insertion plates have broken away; there is no indication of teeth

Remarks.—This species so closely resembles *Lorica volvox*, Rve, that it almost justifies its being referred to that living species; the most marked difference is in the compression of the valves. In *volvox* there is a slight widening or separating of the two slopes at their extremities, whereas in the species now described there is a slight drawing together. The other differences are the absence of transverse striæ (but this may be accounted for through the wearing of the shell) and the more decussated effect produced by the megalopores. Its close affinity to *Lorica volvox*, Reeve, is undoubted.

3. Loricella gigantea, *n. sp.* Pl. iv., fig. 3.

One specimen of anterior valve only.

General Appearance.—Color dirty-white or wainscot-brown, shape exceptionally broad (nearly twice as broad as long) and very flat, anterior third of valve curved downwards, other two-thirds practically straight except at the apex, which is very slightly elevated.

Sculpture.—Radially ribbed with very numerous, pronounced, bifurcating riblets, which are crossed by about 26 concentric wrinkles; while these are clearly defined, some are more so than

others. These wrinkles break up the riblets into more or less pronounced granules. The eves only slightly overhang. Slits 18, at irregular distances. Margins of teeth are irregular, more crenulate than pectinate. The strong pectination of its congener, *Loricella Angasi*, Ad. and Ang., is quite absent, but the teeth are deeply grooved to their bases, very little indication of this being present in the living form. In *L. Angasi* a deep groove runs from each slit to the apex. In the fossil under review there is no groove, but its place is occupied by a slightly raised rib.

Inside of Shell (Articulamentum).—The valve, except where stained, is paler than the tegmentum, a rib running from each of the slits to the apex, except that from the posterior slit, which is almost parallel with the posterior margin of valve.

Measurement.—Length, 16 mm.; breadth, 33 mm.; elevation, $7\frac{1}{2}$ mm.

Locality.—Mornington.

Remarks.—As compared with *Loricella Angasi*, the valve is much flatter, is convex instead of concave. The coarse radial ribs, nine or more in number, present in *L. Angasi*, are entirely absent, the riblets being evenly distributed over the whole valve. The largest specimen of *L. Angasi* known to us measures 68 mm. by 44 mm. This valve is fully one-fourth larger than the anterior valve of that specimen, and therefore we may conclude that when living this ancient form would have measured fully 85 mm. by 55 mm.

4. Plaxiphora concentrica, *n. sp.* Pl. iv., fig. 8.

One example of posterior valve only.

General Appearance.— Broad, rounded. Color pale-brown, slightly olivaceous. The tegmentum is posteriorly bent over, and continued for some distance on the underside of shell. Mucro evidently postmedian, though much worn. The anterior portion of shell well preserved, showing six strong concentric ribs, each following closely the contour of the margin of the shell. There are evidences that these ribs were continued without any break right round the posterior margin, though the ribbing in this part of shell is less strong, and the ribs are closer together. No other sculpture is discernible on the tegmentum. Insertion plates unslit in the posterior valve.

Measurement.— Posterior valve, total width 17 mm., total length, 10 mm.; width of tegmentum only, 15 mm.; length of tegmentum only, 7 mm.

Inside.—Articulamentum white, sinus 4 mm. wide at apex, 8 mm. at widest part. Sutural laminæ produced beyond the tegmentum, $4\frac{1}{2}$ mm. The sutural laminæ and insertion plates are remarkably posteriorly thickened. The two dorsal pits and lateral grooves are very deep.

Remarks.—This shell is allied to the living forms *Plaxiphora petholata*, Sby , and *P. glauca*, Q. and G., rather more so to the latter than to the former. It is more strongly concentrically ribbed, more evenly rounded, sinus narrower, sutural laminæ twice the length, the anterior margin of tegmentum slightly produced forward in the centre of the sinus, and the inside is white instead of greenish-blue. The microscopic vermiculate wrinkling is quite absent in the specimen under description.

5. Plaxiphora gellibrandi, *n. sp.* Pl. iv., fig. 1.

One example of posterior valve.

General Appearance.—Broad, flat, jugum slightly raised, side slope nearly straight. Color blackish, with irregular streaks of green. A pale broad wedge-shaped mark on dorsal ridge.

Mucro.—Post median, slightly raised.

Dorsal Area.—Slightly raised and ornamented with a broad whitish wedge-shape mark. A shallow curved diagonal rib runs from the mucro forward, keeping near the margin of valve. The whole of the valve is ornamented with the same peculiar sculpture that is present in *Plaxiphora petholata*, Sby., and which Sowerby in his description describes as a microscopic pattern resembling a dense punctulation, united with a minute zigzag or vermiculate wrinkling.

Measurement.—Posterior valve, total width 14 mm., total length 8 mm.; width of tegmentum only, 11 mm.; length of tegmentum only, 5 mm.

Inside.—Articulamentum white, sinus 3 mm. at apex, increasing to 6 mm.; sutural laminæ produced beyond tegmentum 3 mm. The eves are shallow and spongy. The articulamentum of insertion plates and sutural laminæ is greatly thickened. The two dorsal pits and corresponding lateral grooves are very deep.

Locality.—Eocene beds, Gellibrand, Victoria.

Remarks.—This species very closely resembles *P. petholata*, Sby. The inside pits and lateral grooves are deeper, and the inside color white instead of greenish blue. The shell is also broader, and the anterior margin of tegmentum is slightly produced forward.

6. Acanthochites (Notoplax) granulosus, *n. sp.* Pl. iv., fig. 9.

Two examples of median valves.

General Appearance.—Carinated beaked, side slope straight, except lateral area, which is reflex ; color mottled in two shades of green, somewhat bleached.

Dorsal Area.—This area is clearly defined, being broadly wedge shape, produced forward in a distinct beak, which is slightly bent downwards. A shallow depression separates this area from the pleural. Sculpture consists of about a score of

longitudinal, closely packed granulose riblets. The granules increase in definition towards the margin of the pleural area, where they will be more correctly described as longitudinal rows of granules.

Pleural Area.—In this area the rows of granules are radial, the rows being separated, widely apart, and very regular. In this area the granules become large, digitate, in some cases pointed, inclined very much forward, the apex of one just reaching to the base of the one in front of it. Where the apex is broken off the pustules are seen to be hollow.

Lateral Area.—Raised or recurved, clearly defined, the pustules being rounded and granulose, becoming crowded and irregularly placed as they approach the posterior margin of valve.

Inside.—The articulamentum was probably white. The insertion plates are well produced, though in the specimens under examination rather broken, and apparently unslit. The upper surface of the sutural laminæ is irregularly grooved, sinus broad.

Measurement.—Width of valve, 7 mm.; length of valve, 7 mm.; length of slope, 5 mm.; divergence, 100°.

Locality.—Schnapper Point.

7. Acanthochites rostratus, *n. sp.* Pl. iv., fig. 5.

One median valve.

General Appearance.—Carinated, side slope straight, strongly beaked. Color porcelain white.

Dorsal Area.—Wedge shape, much raised, convex, strongly beaked, the beak bent downwards This area is smooth and glossy under an ordinary pocket lense, but under a fairly high power it is seen to be pitted with irregular shallow pitting, highly polished.

Lateral and Pleural Areas.—These areas are hardly separable. The shell is a little thickened, and the sculpture a little coarser in the lateral area. The ornamentation consists of a number of somewhat irregular longitudinal rows of finger-shaped flattened pustules. The pustules are set diagonally in the rows, and increase to double the size as they reach the margin of the shell. The posterior margin of valve is bent downwards.

Measurement.—Longitudinally, 3 mm.; breadth, 5 mm.; divergence, 105°.

Inside.—White, insertion plates and sutural laminæ not large, sinus broad and shallow, only indicated by a slight sinuosity of outline.

Locality.—Schnapper Point.

8. Chiton fossicius, *n. sp.* Pl. iv., fig. 4.

One example median valve.

General Appearance.—Valve narrow, carinated, side slopes nearly straight. Color pale olivacious buff.

Lateral Area.—This area is separated from the pleural area by a much raised, broad, diagonal rib. This rib occupies fully one-half of the area; on the other half are two shallow radial ribs.

Pleural Area.—This area appears to have been sculptured right up to the dorsal ridge, with about 13 sharply chiselled, imbricating longitudinal ribs. The sutures between the ribs are deeply cut, and end as they reach the raised diagonal rib of the lateral area in a very deep pit So deep are these pits that with the naked eye they appear to be perforations through the tegmentum.

Dorsal Area.—This area is much worn, but, as before stated, there are indications that the ribbing of the pleural area was continued right over this area. The valve is slightly beaked, which is smooth, no striæ being discernible.

Measurement.—Greatest width between the slopes, 10 mm.; greatest width of slope, 4 mm.; length of slope, 7 mm.; divergence, 95°.

Remarks.—Under a strong lense the whole valve, except the beak, is found to be decussated or ornamented with a network of perforations, this being due to the exceptional development of the megalopores. The sutural laminæ are much broken away, but the sinus was probably fairly broad and shallow. The insertion plates are quite missing—they have probably broken away. The most striking feature of this shell is the diagonal row of deep pits in the pleural area, and the much elevated broad diagonal rib of the lateral area.

Locality.—Table Cape.

9. Chiton paucipustulosus, *n. sp.* Pl. iv., fig. 2.

One medium valve from Table Cape. A well-preserved specimen.

The *Lateral Area* is slightly raised, and contains a number of wavy transverse sulcations, or growth lines, extending into the pleural area. There are 12 to 14 small pustules on the anterior margin of the lateral area.

Pleural Area.—The growth lines are very distinct in this area, and extend across the jugum. There are about 12 short longitudinal imbricating riblets, those nearest the jugum being the longest, and becoming shorter as they approach the centre of slope, those near the centre being mere elongated lumps. From the centre to the girdle they are absent.

Length of dorsal area, 6 mm. Sinus wide, increasing from 2 to 4 mm. The sutural laminæ are 3 mm. wide near the sinus, gradually lessening towards the girdle. The pectination of the teeth is fairly distinct.

Measurement.—Width, 25 mm.; length of area, 6 mm.; divergence, 105°.

Remarks.—The shell is glossy olive-green, blotched with olivaceous cuneiform dashes.

10. Lepidopleurus, *sp. indet.*

One median valve.

The sculpture in good preservation, although the lateral areas are broken away.

Color.—Creamy white.

Lateral Area.—Raised, ornamented with six regular, radial rows of flattened granules. These are large at the girdle, and gradually diminish towards the jugum.

Pleural Area.—Sculptured with 16 rows of granulose-longitudinal ribs. The interspaces double in width as they approach the anterior margin.

Dorsal Area.—Much worn.

Inside.—The sinus appears to have been wide and shallow. The usual diagonal rib is much raised and rather curved.

Measurement.—The valve is 2 mm. longitudinally, and about $4\frac{1}{2}$ mm. in breadth; divergence, 100°.

11. Ischnochiton, *sp. indet.*

Six median valves from Muddy Creek.

The lateral, pleural, and dorsal areas contain a series of 20 to 30 rows of minute triangular pits, converging towards the apex, and having a confluent tendency.

The sinus is about 5 mm. The side slopes are slightly curved. The dorsal area is decidedly beaked, some of the valves being 7 mm. in length; divergence, 95° to 110°.

Remarks.—It is extremely doubtful whether these specimens are referable to the above genus, but without better material it is impossible to be certain.

12. Chiton, *sp. indet.*

One valve, very much worn.

The lateral area distinctly raised, with three or four deep sulcations.

The dorsal area is 9 mm, and has a decided beak.

Width of valve, 17 mm.; divergence, 95°.

The side slopes are slightly curved outwards.

A strong costa in the articulamentum runs up to the dorsal area.

The contour of this valve approaches that of valve two of *Plaxiphora petholata*, Sby.

Locality.—Muddy Creek.

13. Ischnochiton, *sp. indet.*

One median valve from Muddy Creek.

The areas are indistinctly marked.

The sutural laminæ are half the width of the tegmentum.

Width of valve, 20 mm. The length of the dorsal area is 5 mm.; divergence, 130°.

The generic position of this species is doubtful, but the thinness of the shell and the angle of divergence lead one to conclude that it rightly belongs to the above genus.

14. Chiton, *sp. indet.*

Two median valves from Muddy Creek.

Lateral Area.—Distinctly raised, the anterior margin being the most elevated. Three or more deep concentric growth lines cross the area. A very shallow radial ribbing is distinctly present near the girdle, but it disappears as the jugum is approached.

Pleural Area.—This area is ornamented with imbricating longitudinal ribbing. These ribs are strong near the girdle, but become shallower as they approach the jugum. The jugum is much worn.

Measurement.—Width, 8 mm.; length, 4 mm.; divergence, 80°.

15. Chiton, *sp. indet.*

One specimen anterior valve.

Slope strongly convex.

Shell polished, the only ornamentation being about 20 shallow concentric ridges.

Inside.—The articulamentum is crossed laterally by a strong ridge. The pectination of what remains of the insertion plate is most pronounced.

16. Chiton, *sp. indet.*

One median valve from Muddy Creek.

Lateral Area.—Much broken away, slightly raised, sculptured with strong broken longitudinal ribs.

Pleural Area.—Ornamented with shallow, but distinct longitudinal ribbing, the interspaces being twice the width of the ribs.

Dorsal Area.—Much worn.

Measurement.—Width, 8 mm.; length, 4 mm.; divergence, 95°.

17. Lorica, *sp. indet.*

Two median valves from Muddy Creek, both much worn.

Decidedly carinated, side slopes slightly curved.

The *Lateral Areas* are raised, and contain three or four deeply marked radial sulcations, converging at the apex.

The *Pleural Areas* have from eight to ten deep longitudinal ridges, gradually lessening in width towards the girdle.

The *Dorsal Areas* are too much worn to admit of description.

Length of Dorsal Area.—One valve 11 mm., the other 8 mm.; width, 23 mm. and 20 mm. respectively; divergence, 90° and 95°.

The interior of the large valve has a decided internal costa running transversely, and a folded pleat in the posterior margin. The shell bears a striking relationship to the modern *Lorica volvox* of Reeve.

18. Acanthochiton, *sp. indet.*

One median valve.

Latero-pleural Area covered with triangular elongated, flattened pustules.

The *Lateral Area* is slightly raised.

The insertion plates are large, being more than half the width of the latero-pleural area.

The *Dorsal Area* is broad wedge shape, but very much worn.

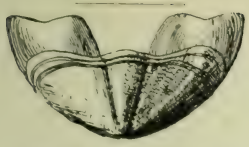
Measurement.—Width, 8 mm.; length, 5 mm.; divergence, 130°.

Remarks.—This specimen bears a strong resemblance to *A. crocodilus*, Torr and Ashby.

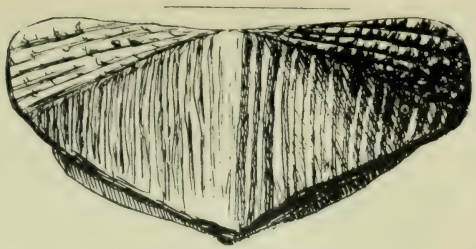
Locality.—Muddy Creek.

19.

Five valves from Muddy Creek, and one valve from Schnapper Point, all very worn.

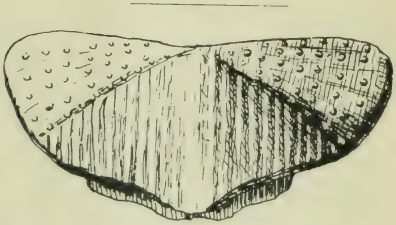


1. Plaxiphora gellibrandi.

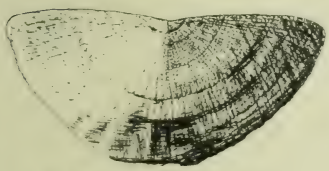


6. Lorica compressa.

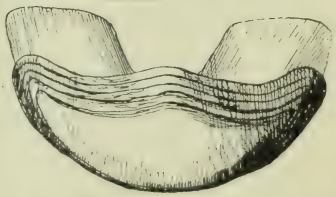
2. Chiton paucipustulosus.



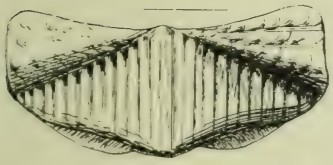
7. Lorica affinis.



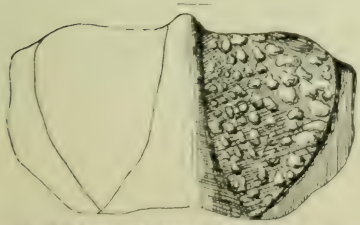
3. Loricella gigantea.



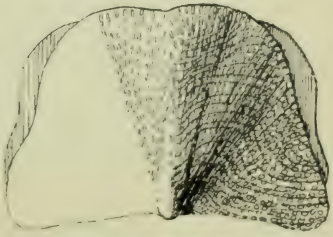
8. Plaxiphora concentrica.



4. Chiton fossicius.



5. Acanthochites rostratus.



9. Acanthochites granulosus.

On the Occurrence of Miocene Limestones at Edithburgh, and their Stratigraphical Relationship to the Eocene of Wool Bay, with Description of a New Species by Professor R. Tate.

By Herbert Basedow.

[Read July 2, 1901.]

Plate III.

As far back as 1885 Professor Ralph Tate recorded and described a few species of fossil mollusca from a sub-crystalline limestone at Edithburgh, but was doubtful of its correct age. He, however, thought it to be Miocene, as the difference between its physical characters and those of an Eocene series a few miles to the north of Edithburgh were marked, as also because of a view adopted in the "Revision of Older Tertiary Mollusca," 1899.

As this limestone has recently been quarried, an increased number of species have been brought to light, consequently it was thought desirable to reinvestigate this fossiliferous bed. I submit more pronounced palæontological and stratigraphical proofs that Miocene beds do occur at Edithburgh.

A quarter-mile north of Edithburgh a deposit of polyzoal limestone, containing such well-known and characteristic Eocene fossils as *Fibularia gregata*, *Scutellina patella*, *Paradoxechinus novus*, is found underlying yellowish compact limestones. Pebbles are to be seen at the base of this compact limestone, and on close examination they were found to consist of fragments of the polyzoal limestone. This clearly demonstrates that the Eocene bed must have been elevated into a land surface, suffered denudation, and, during a later period of subsidence, was covered by the yellowish compact limestone.

A clearer demonstration that such a sequence of changes did occur is to be found in a splendid example of an erosion line between the undoubted Eocene bed and those above it. At this spot the top surface of the Eocene bed has an altitude of 26 feet above sea level. About 200 yards further north the same Eocene bed, still covered by the compact limestone, has a vertical height of only six feet above sea level, and the erosion line exposed on the face of the cliff between the two sections is well marked. This erosion line extends southwards, exposed at intervals along

the face of the cliff; and at a distance of about a quarter to half a mile from the previous sections fossils of a Miocene type were found in the yellow compact bed above the Eocene. The most prominent of these fossils were *Spondylus arenicola* (characteristic of the Miocene of Aldinga), *Pecten antiaustralis*, *P. sub-bifrons*, *P. palmipes*.

At Wool Bay, to the north of Edithburgh, the Eocene is capped directly by beds of travertine, and the cliffs are here about 60 feet high.

Almost immediately southwards, however, a band of clay of a sticky nature when moist, and red in color, makes its appearance. An artificial section gave—

	Feet.
Recent travertine	13
Red-compact clay	15
Polyzoal limestone	—

Travelling southwards, the Eocene becomes more arenaceous and of a finer nature, showing two distinct beds, the lower being a pink, compact, crystalline polyzoal limestone, while the upper is yellow in color and much softer.

The following section was taken about two miles south of Wool Bay:—

Travertine and soil
Variegated arenaceous clay (unfossiliferous)
Oyster band consisting, as at Aldinga, of *Ostrea arenicola*
White limestone
Eocene limestone

The top of the Eocene limestone, greatly eroded, has a mean altitude of about six feet above sea level, and is covered unconformably by the white limestone, which contains fossils characteristic of Miocene beds—*Ostrea arenicola* and *Pecten antiaustralis*, in company with *Tellina*, *Cardita*, *Diastoma*, and *Chione* being abundant.

The variegated arenaceous clay of this section is quite different in physical features from the red sticky clay of the Wool Bay section described above.

Leaving the coast and travelling westwards to a point distant one and a quarter miles from Edithburgh, a well section indicates the age of the unfossiliferous clay bed of the section taken two miles south of Wool Bay—

	Feet.
Black soil	1
Rubbly limestone (fossiliferous)	10
Variegated arenaceous clay (unfossiliferous)	11
White rubbly limestone (fossiliferous) ...	2
Yellow sandstone (fossiliferous)	2
Hard compact limestone.	

The variegated arenaceous clay is of Miocene age, as it lies between beds of Miocene limestone, the overlying bed containing species of *Pecten antiaustralis* and *P. sub-bifrons*, while the underlying bed contains *P. antiaustralis*, *P. sub-bifrons*, *P. palmipes*, *Ostrea arenicola*, and *Spondylus arenicola*. This clay, moreover, is similar in its physical characteristics to that of the section two miles south of Wool Bay. The clay of the latter section certainly overlies beds of Miocene age, and, judging from this similarity in physical features, the clay of the coast section is also of Miocene age.

The yellow sandstone of this inland well section underlies the white rubbly Miocene limestone and contains the fossils—*Amussium Hochstetteri*, *Fibularia gregata* and other Echinoids, and *Dimya dissimilis*; consequently it is of Eocene age.

The hard compact limestone underlying the yellow sandstone contains only obscure casts of fossils, but among these *Trigonia semi-undulata* can be recognised and is plentiful.

APPENDIX.

List of Fossils from Miocene Limestone about Edithburgh.

(Revised by Professor R. Tate.)

Name of Species.	Other Miocene Occurrences.
Semicassis subgranosa, *Tate*, 1888	—
Diastoma, *spec. nov.*	Hallett's Cove
Campanile triserialis, *spec. nov.*	Hallett's Cove
Voluta, *spec. indet.*	—
Mitra, *spec. indet.*	—
Trochocochlea, *spec.*	—
Kuphus, *spec. indet.*	—
Haliotis, *spec. nov.*	Hallett's Cove
Pecten antiaustralis, *Tate*, 1885	Adelaide, Hallett's Cove, Aldinga Bay (S.A.), Muddy Creek, Gippsland Lakes, Shelford (Victoria)
Pecten sub-bifrons, *Tate*, 1882	Adelaide, Hallett's Cove, Aldinga Bay
Pecten palmipes, *Tate*, 1885	Aldinga Bay
Dosinia Grayii, *Zittel*, 1873	Gippsland Lakes (Vict.), Pareora and Wanganui (New Zealand)
Limopsis Forskali, *Adams*	Gippsland Lakes
Ostrea arenicola, *Tate*, 1885	Adelaide, Aldinga Bay
Spondylus arenicola, *Tate*, 1886	Hallett's Cove, Aldinga Bay

Limatula Jeffreysiana, *Tate*, 1884	Aldinga Bay, River Murray Cliffs (S.A.), Muddy Creek (Vict.)
Glycimeris subradians, *Tate*, (M.S.)	Hallett's Cove
Meretrix sphericula, *spec. nov.* (M.S.)	Aldinga Bay, obscure casts only
Cardium, *spec. nov.*	—
Cardita, *spec. nov.*	—
Tellina Basedowi, *Tate*, spec. nov.	—

Tellina Basedowi, *Tate*, spec. nov.

Plate III.

Shell rotundly-trigonal, solid, nearly equilateral, moderately convex. Ornamented by concentric, erect, short lamellæ—about ten in 5 mm. length in the medio-ventral region—and radial striæ, which are visible only on the partially decorticated surfaces.

Ventral margin subarcuated; dorsal slopes strong, the posterior nearly straight and roughened by the edges of the concentric sulci, dorsal [post ?]-ventral tip angulated, anterior margin-rounded; the posterior fold and flexure very moderate and submarginal.

Beaks depressed, obtuse, contiguous; lunule deeply sunken, ligament occupying about one-half its length.

Interior unknown.

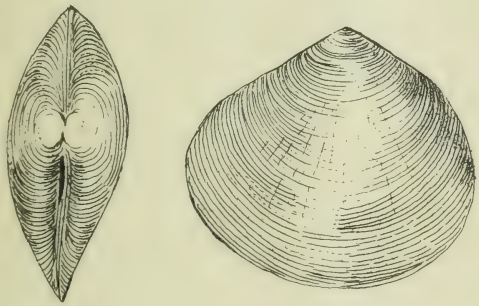
By external characters comes near *T. capsoides* and *T. deltoidalis*, differing by more rotund marginal outline.

Dimensions.—Ant.-post, 40 mm.; umbo-vent., 35; sectional diameter, 17.

Locality.—Common in Miocene limestone in the neighborhood of Edithburgh, Yorke Peninsula (*H.B.*).

The type specimen has been deposited in the Museum of the Adelaide University.

[The above description is the last of the numerous contributions of the late Professor Ralph Tate, who has been recognised as having a place among the highest authorities in natural science, and one to whom students of palæontology, especially in Australia, are deeply indebted. It was but a few hours before his much lamented death that the late Professor read the above description to me. This is but another proof of the earnest and sincere devotion to natural research which characterised him even to the last moments of his valuable life.—H. Basedow.]



TELLINA BASEDOWI *(Tate)*.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia

FOR 1900-1901.

ORDINARY MEETING, NOVEMBER 6, 1900.

Prof. RALPH TATE, F.G.S. (Vice-President), in the chair.

EXHIBITS.—Prof. RALPH TATE exhibited a fossil leaf (*Cordia ?*) collected by the Superintendent of the Stockade from a very fine grained calcareous sandstone overlying the quartzites in the quarry. Assigned age is upland Miocene. J. G. O. TEPPER, F.L.S., showed a double-flowered specimen of *Tetratheca ericifolia*, this deviation from normal structure being probably the result of local irritation in the plant itself. A. H. C. ZIETZ, F.L.S., &c., a specimen of *Acanthiza*.

PAPER.—"Description of a New Species of *Acanthiza* from South Australia," by A. H. C. ZIETZ, F.L.S., C.M.Z.S., &c., Assistant-Director of the Museum.

ORDINARY MEETING, DECEMBER 4, 1900.

Prof. E. H. RENNIE, D.Sc. (President), in the chair.

EXHIBITS.—A. H. C. ZIETZ, F.L.S., &c., specimens of *Acanthiza*, with special reference to the new species described in his paper read before the Society at the last ordinary meeting. He considered *A. tenuirostris* to be intermediate between *Geobasileus reguloides* and *A. uropygialis*—smaller than the former, but of the same size as the latter bird, and with similar bill, but to be distinguished from either by entire absence of any bright coloring at the base of the tail feathers. EDWIN ASHBY, specimen of the white superb warbler (*Malurus leuconotus*) from near Nackara, on the east side of the Flinders Range; also a specimen of orange-fronted *Ephthianura* (*E. aurifrons*). J. G. O. TEPPER, F.L.S., curious abnormal specimen of Foxglove (*Digitalis purpurea*) and a specimen of carborundum, produced

in electrical furnace, at very high temperature, from the union of carbon and silicon. WALTER HOWCHIN, F.G.S., specimens of rocks from Yorke's Peninsula and Kangaroo Island.

PAPER.—"Suggestions on the Origin of the Salt Lagoons of Southern Yorke's Peninsula," by WALTER HOWCHIN, F.G.S.

BALLOT.—Stirling Smeaton, B.A., C.E., and Chas. F. Johncock as Fellows.

ORDINARY MEETING, APRIL 2, 1901.

Prof. E. H. RENNIE, D.Sc. (President), in the chair.

Mr. HOWCHIN, referring to the great loss which the Empire had suffered since the last meeting of the Society in the death of the Queen, reminded those present that Her Majesty was for many years the Patron of this Society, and proposed that a fitting letter of sympathy and condolence should be prepared and forwarded to His Majesty King Edward VII., through His Excellency Lord Tennyson. Carried.

PAPERS.—"Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species," by Rev. THOS. BLACKBURN, B.A. "Preliminary Notes on the Existence of Glacial Deposits of Cambrian Age in South Australia," by WALTER HOWCHIN, F.G.S. "A South Australian Meteorite," by G. A. GOYDER, Government Analyst and Assayer.

ORDINARY MEETING, MAY 7, 1901.

Prof. E. H. RENNIE, D.Sc. (President), in the chair.

EXHIBITS.—Prof. RALPH TATE, F.G.S., exhibited a *Succinea*, the first land shell from the mammaliferous deposits, Lake Callabonna. WALTER HOWCHIN, F.G.S., photographs of the Cambrian glacial beds recently discovered by him in the valley of the Sturt River. These were taken by Mr. Greenlees, of Plympton. Mr. HOWCHIN also exhibited a very interesting series of photographs taken by Prof. David, F.R.S., of Sydney, when he recently visited Mount Kosciusko, of grooved and striated rocks, terminal moraines, and other features of the Post-Pliocene glaciation of that district. J. G. O. TEPPER, F.L.S., &c., exhibited a sprig of Eucalyptus with a colony of scale insects (*Eriococcus*) which produce the manna found under certain gum-trees.

PAPERS.—"Mode of Motion and Transference of Energy Through Space, more especially of Light and Heat," by J. G. O. TEPPER, F.L.S., &c. "Notes on Glacial Beds of Cambrian Age in Far North of South Australia," by C. CHEWINGS, Ph.D., F.G.S. "Further Notes on Eocene Corals" (Part III.), by J. DENNANT, F.G.S.

Ordinary Meeting, June 4, 1901.

W. L. Cleland, M.B. (Vice-President), in the chair.

Exhibits. — Edwin Ashby, a handsome pair of Grebes (*Podiceps cristatus*) from Victoria. Stirling Smeaton, B.A., Kurdaitcha native tracking and hunting shoes made of Emu and other feathers and human hair, from Oodnadatta. G. A. Goyder, a meteorite of considerable size, also a portion ground down and etched, showing crystallization.

Ballot.—J. A. Haslam, B.Sc., Registrar of School of Mines, Adelaide, as a Fellow. Herbert Basedow and Edith Collison, B.Sc., as associate members.

Paper.—"Notes on the Extinct Volcanoes of Mounts Gambier and Schank," by Walter Howchin, F.G.S.

Ordinary Meeting, July 2, 1901.

Prof. E. H. Rennie, D.Sc. (President), in the chair.

Exhibits.—Walter Howchin, F.G.S., a specimen of pure white crystalline stalagmite from the old drive in Anstey's copper mine, near Highercombe. It has a satin-like lustre, and is in the form of aragonite. The deposit from which this stalagmite was taken varies in thickness up to an inch, and perhaps averages a quarter of an inch, and represents about 55 years' growth —a much more rapid increase than a similar formation in Kent's Cavern, Devonshire, England, which has only increased one-twentieth of an inch in 200 years. This remarkable difference is due, Mr. Howchin thinks, to the very moist condition of the drive and the great evaporation during the year. Near the mouth of the drive the floor and walls are covered with a thick calcareous tufa, produced by the deposit of carbonate of lime on the growing moss. Richard Kleeman, a specimen of highly-fossiliferous calcareous rock from Margaret Creek, Far North, probably of Lower Cretaceous age. Tin crystals from South Lake, and asbestos from the North. J. G. O. Tepper, F.L.S., some galls on Eucalyptus leaves, closely resembling large brown caterpillars. Mr. Tepper, remarking on the large increase of the gall insect, stated that when a boy he had great difficulty in finding galls, but now since Parrots—whose fondness for these was well known—had been killed or driven away, galls had increased to a very dangerous degree.

Paper.—"On the Occurrence of Miocene Limestones at Edithburgh, and their Stratigraphical Relationship to the Eocene of Wool Bay," by Herbert Basedow.

Ordinary Meeting, August 6, 1901.

Prof. E. H. Rennie, D.Sc. (President), in the chair.

Exhibits.—A. H. C. Zietz, F.L.S., &c., clusters of crystals from near Blinman.

PAPER.—"Notes on the Geology of Encounter Bay," by GEOFFREY DUFFIELD, B.Sc. In this paper Mr. Duffield described two exposures of raised beaches, one situated about three-quarters of a mile up the Inman River, in two sections, separated by a quarter of a mile, and reaching a maximum thickness of 16 feet. The other exposure occurs in the railway cutting near the mouth of the Hindmarsh River, at about 20 feet above high-water mark. Several erratics of granite not previously noted were observed at the back of Mr. Cudmore's house. One measured 12 feet by 10 feet. Brown's Hill, situated N.W. of Victor Harbor, is mainly composed of a highly silicious quartzite rock, with a dip of 70° and a strike of 30° W. of S. As the beds extend in a south-westerly direction they become more micaceous, with veins of quartz, but the dip and strike remain unaltered. Rosetta Head is a granite mass intruding into the quartzites and schistose rocks. The junction shows contact metamorphism. On the seaward side of the Head a diorite dyke penetrates the granite, with a strike parallel to the face of the cliff for the depth of a hundred yards. A second granite outcrop is seen on the landward side, separated from the main mass by a belt of quartzite. Granite Island was described as consisting chiefly of granite, but includes two well-defined quartzitic areas within the granite mass, which have been more or less altered by contact with the latter. The granite has also caught up into its flow many isolated fragments of the adjacent beds, which have preserved their sharply angular outlines without apparent alteration.

ANNUAL MEETING, OCTOBER 1, 1901.

Prof. E. H. RENNIE, D.Sc. (President), in the chair.

EXHIBITS.—WALTER HOWCHIN, F.G.S., some specimens of quartzite from near Petersburg, showing striations due to ice action, and a block of graphic granite similarly marked. There being none of the latter rock nearer than Yorke's Peninsula, this piece of rock would seem to indicate the general direction of the ice movement during the Cambrian period.

Annual report and balance-sheet were read and adopted.

ELECTION OF COUNCIL.—President, Prof. Edward H. Rennie, M.A., D.Sc., Lond.; Vice-Presidents, Walter Howchin, F.G.S., W. L. Cleland, M.B.; Honorary Treasurer, Walter Rutt, C.E.; Honorary Secretary, G. G. Mayo, C.E.; Members of Council, Rev. Thos. Blackburn, B.A., Sam. Dixon, W. H. Selway, Edwin Ashby, A. M. Morgan, M.B., Ch.B., and W. B. Poole; Auditor, J. S. Lloyd.

THE PRESIDENTIAL ADDRESS read by the PRESIDENT, upon the motion of W. HOWCHIN, seconded by SAM. DIXON, was ordered to be printed in the Society's "Transactions."

PAPERS. — "Fossil Polyplacophoræ from Eocene Beds of Muddy Creek, Mornington, and Moorabool (Victoria), with Definitions of Ten New Species, and Notes on others," by EDWIN ASHBY and W. G. TORR, LL.D. "Further Notes on Australian Coleoptera, with description of New Genera and Species," by Rev. THOS. BLACKBURN, B.A. "Description of New Genera and Species of Australian Lepidoptera," by OSWALD LOWER, F. Ent. S. Lond. "List of some Western Australian Birds, with Notes made during a short visit to Western Australia," by EDWIN ASHBY.

Proposed by WALTER HOWCHIN, F.G.S., seconded by W. L. CLELAND, M.B.. and carried—"That this meeting place on record the very great loss the Royal Society of South Australia, as well as the scientific community of Australia in general, has suffered by the death of Professor Ralph Tate. Prof. Tate took a leading part in the foundation of this Society, and has enriched its publications with numerous and very valuable contributions on Australian Geology, Palæontology, and Botany. It is a matter of deep regret to this Society that he has not lived to complete his great work in elucidation of the mollusca of the Australian Tertiaries, and that whilst still in the vigor of life the Society should be bereft of his ripe experience in its councils and his extensive knowledge of scientific matters, which added so much to the interest of its meetings. This meeting extends its most sincere sympathy to his widow and family in their severe bereavement."

Moved by EDWIN ASHBY, seconded by A. H. C. ZIETZ, F.L.S., and carried—"That in the opinion of this Society the typical geological, botanical, and conchological collections of the late Professor Ralph Tate should be preserved to this State, and that the Council of this Society be requested to take all necessary steps to this end."

ANNUAL REPORT.

OCTOBER 1, 1901.

The Council report that the interest in scientific research has been fairly maintained during the year. The following papers have been laid before the Society :—

"Description of a New *Acanthiza* from South Australia," by A. H. C. Zeitz, F.L.S.

"Mode of Motion and Transference of Energy through Space, more especially of Light and Heat," by J. G. O. Tepper, F.L.S.

"Suggestions on the Origin of the Salt Lagoons of Southern Yorke's Peninsula;" "Preliminary Note on the Existence of Glacial Beds of Cambrian Age in South Australia"; "Notes on the Extinct Volcanoes of Mount Gambier and Mount Schank, South Australia," by Walter Howchin, F.G.S.

"Notes on Glacial Beds of Cambrian Age in Far North of South Australia," by C. Chewings, Ph.D., F.G.S.

"A South Australian Meteorite," by G. A. Goyder, F.C.S., Gov. Analyst.

"Descriptions of New Species of Corals from Australian Tertiaries," by J. Dennant, F.G.S.

"Notes on Australian Coleoptera," by Rev. Thos. Blackburn, B.A.

"On the Occurrence of Miocene Limestones at Edithburgh and their Stratigraphical Relationship to the Eocene of Wool Bay," by Herbert Basedow.

"Notes on the Geology of Encounter Bay," by Geoffrey Duffield, B.Sc.

"Fossil Polyplacophoræ from Eocene Beds of Muddy Creek, Mornington and Moorabool, Victoria, with definitions of ten new Species and Notes on others," by Edwin Ashby and W. G. Torr, L.L.D.

"Description of New Genera and Species of Australian Lepidoptera," by Oswald Lower, F. Ent. S. Lond.

"List of some Western Australian Birds, with notes made during a short visit to Western Australia," by Edwin Ashby.

During the year many objects of scientific interest have been exhibited by Fellows and members.

The membership of the Society consists of 11 Honorary Fellows, 65 Fellows, 7 Corresponding members, and 2 Associates.

The late appearance of Vol. XXV., Part I., was largely due to the failing health of the Editor, the late Prof. Ralph Tate, whose recent death leaves a blank that will not be readily filled.

The Memoirs will not appear this year owing to the absence of Prof. Stirling from the State.

The Malacological Section, which had for some time been inactive, has now resumed work. The Astronomical Section has ceased to exist, while the Field Naturalist Section continues its useful investigations.

Mr. Howchin's great discovery of glaciation amongst the Cambrian rocks in the Sturt River Valley and in the North (near Petersburg) must have a very important bearing, not only upon geological science generally, but particularly upon that of Australia.

The Rev. Thos. Blackburn, who continues to add to our knowledge of the Coleoptera of this State by discovery and classification, has been enabled to identify various species through having certain type specimens of Tasmanian Coleoptera entrusted to him for examination by Prof. Kolbe, of the Royal Museum, Berlin.

Donations by scientific bodies from all parts of the world, especially America, have so largely increased of late years that the possibility of making the vast amount of interesting and valuable matter therein contained readily available to the Fellows and members has become a very urgent question. The first step towards doing this has been the preparation of a card catalogue, which was completed during the year. This catalogue brought to light many breaks and irregularities in the serial literature, but has accomplished little in making the library really useful to the members.

An address from this Society of condolence on the death of our beloved Queen was forwarded through His Excellency the Governor to His Majesty King Edward VII. and the Royal Family; and an address of welcome, suitably illuminated, was presented by the President to their Royal Highnesses the Duke and Duchess of Cornwall and York upon their arrival in the State.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£	s.	d.	£	s.	d.
October 1, 1900.						
To Balance				143	2	0
" Subscriptions—						
Royal Society	55	12	6			
Field Naturalists' Section	15	0	0			
Malacological Section	1	19	0			
				72	11	6
" Government Grants—						
Ordinary	59	1	1			
Illustrating "Fossil Fauna of South Australia"	100	0	0			
				159	1	1
" Interest				5	5	2
" Sale of Memoirs				6	1	5
				£386	1	2

Cr.	£	s.	d.	£	s.	d.
By Cost of Transactions—						
Printing...	66	14	4			
Illustrating	13	5	6			
Publishing	14	2	0			
				94	1	10
" Wages—Caretaker				3	0	0
" Printing, Postage. and Stationery ...				7	3	10
" Library—						
Binding	2	17	0			
Catalogue	8	8	0			
				11	5	0
" Grants-in-aid—						
Field Naturalists' Section	10	0	0			
Malacological Section	1	0	0			
				11	0	0
" Address to Duke of Cornwall... ...				15	15	0
" Advertising				2	7	0
" Exchange on Cheques				0	1	6
" Balance in Savings Bank, October 1, 1901				241	7	0
				£386	1	2

Audited and found correct,

J. S. LLOYD, F.I.A., S.A., Auditor.

WALTER RUTT, Hon. Treasurer.

PRESIDENTIAL ADDRESS.

By Professor E. H. Rennie, M.A., D.Sc.

[Read October 1, 1901.]

At the close of another year we, as Fellows of the Royal Society of South Australia, have cause both for regret and satisfaction. We must all feel a sense of loss this evening, meeting as we do without one distinguished member who for many years worked enthusiastically in the interests of this Society. Professor Tate was an almost constant attendant at our meetings till illness prevented him, and he contributed very largely to their success by the original and interesting matters he brought forward. For a long time he edited carefully our "Proceedings," which contain a long record of his own patient and laborious work in that department of palæontology with which he was specially familiar, work which has been recognised far beyond the limits of this State as of great and permanent value to the scientific world. The Society and the State is much the poorer by his removal from amongst us, and for a long time to come the blank caused by his death will be felt by us at our meetings here.

On the other hand, we have cause for satisfaction, because work of more than usual importance has been accomplished during the year. I refer, of course, more particularly to the discoveries recently made by Mr. Howchin, and confirmed in all respects by Professor David and Mr. Pittman. The details we hope to hear from Mr. Howchin himself at a later date, but in the meantime we congratulate him heartily upon a discovery which is of so much interest and importance. Apart from this special discovery, our "Proceedings" contain the records of solid work done in various departments of science, a record of which we have no reason to be ashamed.

In casting about for a subject on which to address you, it occurred to me that, at what I might venture to call a critical period in the agricultural history of this State, it would be of some interest to give some account of scientific development in connection with agriculture generally, and with special reference to the requirements of this State, and, with that as a text, to refer to other subjects in which there is a crying need for accurate scientific investigation, such investigation being necessary, not merely to elucidate scientific theories, but to improve our material condition.

Commencing then with matters agricultural, or rather agriculturally chemical, it has become apparent in recent years that many old ideas must be discarded. The vague notion that it is only necessary to supply to the soil in any fashion the chemical constituents which go to make up the plant has been of necessity abandoned, and it has been found that almost as much care and attention must be bestowed on feeding plants as on feeding animals, not only with respect to the nature of the food supplied, but also with reference to the manner of its administration and the conditions under which the food becomes assimilable.

Every schoolboy knows that nitrogen must be supplied to plants, but nothing has caused more discussion and given rise to more experiments than the questions whence and how plants obtain their supply of this substance. It has been known from time immemorial that such substances as stable manure, sewage, &c., which when exposed to air decompose, and give off ammonia, are capable when added to the soil of yielding a supply of nitrogen to plants, but till comparatively recently it was not known by what series of processes the nitrogen is made available for use. It became known, however, that all fertile soils contain nitrates, and further, that nitrates are formed in soil under certain conditions, from such substances as I have already referred to, stable manure, sewage, &c. With these data as a starting point investigations were undertaken, which led to remarkable and interesting results. In a paper published in the journal of the Chemical Society of London for 1891, Warington, who was associated as chemist with Gilbert and Lawes, in their world-famed experiments at Rothamstad, in England, summarises the results of experiments carried out chiefly by himself, the principal of which are these :—

1. There are present in fertile soils minute organisms of a bacterial nature, which convert ammonia into nitrates. 2. These organisms are ærobic, and are not found at depths greater than about 6 ft., or perhaps less. 3. The ammonia is first converted into nitrates by a special organism (nitrosomonas), which, however, is incapable of converting nitrites into nitrates, or of directly converting ammonia into nitrates. 4. The growth of this organism, and therefore its activity, is promoted by the presence of carbonic acid, sodium bi-carbonate, and some other substances containing carbon, the carbon being apparently necessary to provide for its growth and multiplication. Ordinary sodium carbonate, however, greatly hinders the action of this organism. 5. There is another organism in fertile soil (nitrobacter), which is capable of energetically converting nitrites into nitrates, but is not capable of directly converting ammonia into nitrites or nitrates. 6. The growth of this organism is also, as

in the case of nitrosomonas, promoted by the addition of a moderate quantity of sodium bi-carbonate, but is hindered by sodium carbonate. It is also hindered by a large amount of ammonia. Hence, if a large amount of ammonia is present it must first be converted almost entirely into nitrites before nitrates can be formed.

The importance of these results is obvious. They place at once upon a sound scientific basis the practice of adding manures containing ammonia, nitrites or nitrates, the ultimate product being always nitrates, provided that the conditions necessary for the life of the working organisms are present. But these results also tell us that there may be conditions, such as, for instance, the absence of either or both of the organisms, or the presence of sodium carbonate, which will either entirely stop or, to a great extent, hinder these necessary processes. Under such conditions, plant life will not flourish.

Recent investigations show, too, that water may play a more important part than has been generally supposed. It is a recognised fact that nitrification takes place more readily in light soils than in strong ones, and this is generally attributed to the more easy penetration of air into the former, air being necessary for the life and work of the bacteria. Schloesing, in a paper published in the "Comptes Rendus" (vol. 125), points out that in strong soils, the particles of which are extremely fine, the thickness of the layer of water surrounding each particle is less than the thickness of that surrounding each particle in a light soil (containing the same amount of water), the particles of which are larger, because the total surface in the former case is greater than in the latter. In a series of experiments he showed that by slightly increasing the quantity of water soils in which nitrification took place imperfectly became immensely improved in that respect, nitrification taking place completely. He draws the conclusion that the action of the organism is in some way connected with the thickness of the layer of water surrounding the particles of the soil, but it is impossible in the small space of an address such as this to explain his reasoning fully.

Warington, in his researches, found that the bacteria to which reference has been made would not grow on gelatine or agar-agar; in other words, such nitrogenous substances as these are not affected by these organisms, and therefore such substances are not directly available for plant food. But it has lately been shown that if along with the nitrifying bacteria another is added which is capable of breaking up the gelatine or agar-agar with formation of ammonia, then the former grow and flourish, and these substances then break down completely, and yield their nitrogen ultimately in the form of nitrates; *i.e.*, in the form suit-

able for plant food. Thus three distinct organisms are necessary to make the nitrogen of complex nitrogenous substances available for plants. This association of various organisms in bringing about important results I shall refer to later; it is one of the most interesting phenomena which modern science has revealed.

Now these various organisms may be deficient in soils in particular cases, and attempts have been made to supply them artificially. For this purpose the bacteria have been cultivated in certain media, and sold under the name of "nitragin." Experiments have been made with this material in Germany and elsewhere, but with very variable results. In some cases great benefit is said to have resulted, in others little or none. More experiments are required before any definite conclusions can be drawn. It is obvious that such a material might fail owing to improper preparation, or that it might appear to fail, not from any want of virtue in itself, but because the soil to which it is added already contains the organisms in sufficient numbers, their activity perhaps being hindered by unfavorable conditions. But there are many other organisms present in soil besides those already referred to, and among these are usually to be found some which have a directly opposite effect, that is, they break up nitrates into nitrites, or may go still further, and destroy them altogether, with liberation and consequent loss of free nitrogen. They are hence known as denitrifying bacteria. Obviously great complexity is here introduced, and the question has to be considered whether these denitrifying organisms can cause serious loss of nitrogen from the soil, and if so under what conditions. It is practically agreed that in some cases excessive quantities of fresh horse or cattle manure exercise an injurious rather than a beneficial effect, and especially that they lessen the effect of nitrogenous manures, such as sulphate of ammonia and nitrate of soda, and it has further been shown that manure of this kind frequently contains these denitrifying bacteria in large numbers. The conclusion was drawn, apparently too hastily, that it is the presence of numbers of these organisms in the excreta of horses and cattle which causes the deleterious effect. Recent investigations, however, have thrown considerable doubt on this conclusion. It has been shown that the denitrifying bacteria are already present, at least usually, in the soil, and it is asserted that the mere addition of a larger number will not account for the phenomena. A large number of experiments have been made to elucidate this question, the results of which have been to show that certain substances—starch, for instance—greatly increase the activity of these bacteria, doubtless because they are particularly suited for food for the organisms, and it has been asserted that some of these food substances are always present in the

straw mixed with the manure, and therefore exercise their stimulating effect. This view, however, is controverted by others, who hold that the stable manure acts simply by interfering in some way with the activity of the nitrifying organisms, and that in actual practice there is no appreciable loss of nitrogen, even although in experiments on the small scale in the laboratory such loss of nitrogen has been proved to occur. These different opinions are not altogether inconsistent with one another, and they may all be in a measure true, but much patient and difficult investigation is yet required.

The question still remains whether plants are able to obtain a supply of nitrogen from any other source than nitrogenous compounds contained in or supplied to the soil. Can they utilise the vast stores of free nitrogen contained in the atmosphere? The answer is not simple, and controversy on this point has raged for many years, and is still raging. It has been proved that some plants can assimilate nitrogen and grow, even although they be planted in soils absolutely free from nitrogen. These are leguminous plants, and certain lower algæ—perhaps mixed with bacteria. But this assimilation or fixation of nitrogen takes place, in the case of leguminous plants at any rate, only under fixed conditions. They must be "infected" with certain organisms (provisionally termed bacteroids, because their nature is uncertain), and unless these bacteroids are present the plants will not grow in the absence of nitrogenous matter in the soil. It is well known that connected with the roots of leguminous plants there are almost always to be found small nodules, like galls in general appearance. When these are examined microscopically they are found to contain enormous numbers of these bacteroids, which can be grown in ordinary media, such as gelatine, and behave in many respects like bacteria. In any soil, containing the other necessary constituents of plant food, but devoid of nitrogen, leguminous plants will grow provided these organisms be added. Experiments have been conducted in such a way as to show that the nitrogen taken up by the plants in these cases can only come from the free nitrogen of the air. But this being granted, the important question is where and how is this nitrogen fixed? There are several possibilities, all of which are ably discussed by Professor H. Marshall Ward in an article published in "Nature" in 1894.

1. The gaseous nitrogen might be directly fixed by the plant, that is absorbed by the cells and converted into the complex nitrogenous constituents of the plant, just as carbon dioxide is absorbed and goes to build up the plant tissues. The weight of evidence, however, is against this view. It is apparently true, as already stated, that certain lower algæ "fix" nitrogen in soils

devoid of nitrogen, but it is doubtful whether they do this without the aid of other lower organisms. In fact, it is stated in one of the most recent papers on the subject by some German scientists that experiments made with certain specified algæ prove that these plants do not fix nitrogen except by the aid of certain bacteria, and that this is probably true in all cases. In this connection it may be stated that Berthelot claims to have proved that certain bacteria can fix nitrogen, and so enrich the soil in nitrogen compounds.

2. This leads to the second view that nitrogen is fixed in the soil by means of bacteria, bacteroids, &c., and is by them converted in the soil into some kind of nitrogenous matter, which is then absorbed by green plants in the ordinary way.

3. A third view is, to quote Professor Ward's own words, that "the fixation of the atmospheric nitrogen can be conceived of as a powerful act of the machinery of the leguminous plant, urged to the necessary expenditure of energy by the stimulating action of the organism in its roots." An opinion as to the correctness of this view might perhaps be arrived at easily if we could determine where the nitrogen is absorbed; that is, whether by the leaves and stems or by the roots. If by the leaves and stems, then the hypothesis just quoted would seem to be a very probable one. This is a matter extremely difficult to deal with experimentally. Professor Ward points out, however, that microscopic examination of the nodules on the roots of leguminous plants indicates, by various signs, that they are the seat of intense physiological activity, and that therefore in all probability they are the seat of the fixation of nitrogen.

4. The fourth and last theory is that the root organisms act merely as accumulators of nitrogenous material which has been fixed in the soil by their means, and that the leguminous plant benefits by "devouring" the bacteroids eventually, and profiting by their stores of nitrogenous material. In this case the bacteroids may be really more parasitic than is represented by the third view of their functions; that is, they may use the root to supply themselves with nutriment, and then by their vital processes to store up nitrogen.

It it evident that a vast amount of careful and difficult experimental work is necessary to decide this question, a question which, however, to use Professor Ward's words, "promises to be of more importance to agriculture in the future than any legislation as to prices, &c., that we can conceive; for if it turns out that the acquisition of free nitrogen by the land, or what is the same thing, the plants growing on it, can

be economically promoted, the farmer and forester may have the control of sources of real wealth not yet dreamt of."

It follows from what has been said, that if leguminous plants, such as peas, are planted as a crop, they will absorb nitrogen from the air and store it up partly in their leaves, partly in their roots. If, therefore, peas are grown as a crop they should increase the total nitrogen in the soil, especially if they be all ploughed in. This has been found to be the case, hence the use of peas for this purpose.

You will not have failed to notice in what has been said the association of organisms in bringing about certain results. This phenomenon, under the name of symbiosis, is attracting great attention in the scientific world, and is proving to be of far-reaching importance. In its widest sense the term may be applied to almost any association of living beings whereby important results are brought about; for instance, the association of the plague bacillus with rats, the bacillus of malarial fever with mosquitos, &c. In the narrower sense, however, the term is used of the co-operation of two or more associated organisms for their mutual benefit. Professor Marshall Ward, in a paper read before the British Association in 1899, brings out the salient points in recent results on this subject, and to this paper I am chiefly indebted for the facts to be brought under your notice.

Several instances are now known in which different kinds of bacteria can, when associated, complete processes which no one kind can complete by itself; witness, for instance, the process of nitrification already referred to. Another remarkable instance is quoted by Winogradsky, who has shown that an anærobic bacterium, *Clostridium pasteurianum*, is able, if supplied with sufficient glucose, and protected from oxygen, to fix atmospheric nitrogen. Now such conditions are not easy to bring about artificially, but when *Clostridium pasteurianum* is active, it is found to be always working in the meshes of a network of ærobic, that is, of oxygen consuming bacteria, the latter rendering possible the activity of the former. Similar phenomena have been observed with fungi. The Japanese drink, saki, or rice wine, is made by infecting the steamed rice with a fungus known as *Aspergillus oryzæ*. This converts the rice starch into sugar, which then undergoes fermentation by the influence of a variety of yeast fungus. So closely is this yeast associated with the *Aspergillus* that for some time a controversy existed as to whether the former was not really a part of the life history of the latter. It is now recognised, however, that we have here a striking case of symbiosis.

Every gardener is aware that whereas certain plants, roses, for example, can be transplanted without difficulty, others are

extremely difficult to transplant. It has been shown that in cases of the latter kind—the ericas, for example—there are intimately associated with the roots of the plant fungi, without which the plant will not grow. Unless the greatest care is taken to carry with the plant, in the act of transplanting, a sufficient quantity of the associated fungus in a living condition the operation is a failure. In some cases it appears that a plant can make use of other but similar fungi to those to which it is ordinarily accustomed. This seems to apply to some forest trees, and in that case transplantation can be accomplished without so much difficulty, provided that the necessary fungus is to be found in the soil to which the tree is transplanted.

In what way these organisms help one another is not easy to decide. It may be that in many cases, as already suggested with the leguminosæ, the lower organism in some way stimulates the higher, perhaps by producing substances which act as stimulants, for it has been shown that certain organic and inorganic poisons can act as plant stimulants if administered in suitable doses, although they may be fatal in large quantities. Or it may be that of two organisms, A and B, B may use up and destroy some substances produced by A, which, if allowed to accumulate beyond a certain limit, would destroy the activity of A. Many cases are known in which an organism produces by its activity a substance which either destroys or greatly hinders its own growth. For example, yeast produces alcohol from sugar, but yeast ceases to act if too much alcohol is present. Whatever be the explanation it is becoming increasingly evident that we are here dealing with a far-reaching principle of nature.

Now, the question naturally arises whether any light is thrown by all this upon results in this country, or whether the investigation of the phenomena to which I directed your attention is likely to be of any importance in connection with the future development of agriculture in South Australia. Reply might be made that if in the opinion of eminent authorities the pursuit of such investigations is likely to be of the highest importance to agriculture generally then as a matter of course they will be of importance here. But certain results have been obtained in this State which deserve special attention. Professor Lowrie has shown as the result of experiments at Roseworthy that nitrogenous manures when added to phosphatic manures in that and similar districts do not produce anything like so much additional effect as they do in Europe, though in some experiments at Millicent he informs us that he got a much greater effect. He states that very probably the difference between the two cases may be due to the fact that in Europe (and this applies also to Millicent in comparison with Roseworthy) with a

heavier rainfall and greater sub-drainage, nitrates are washed out of the soil much more rapidly, and that it therefore becomes rapidly comparatively poor in nitrates, and responds more vigorously to a dose of nitrogenous manure. But it still remains to be explained how it comes about that at Roseworthy, after taking off the land good crops of wheat, &c., which must necessarily remove quantities of nitrogen from the soil, it is still possible, without the addition of nitrogenous manure, to obtain further good crops of a similar kind. Is there such a superabundance of nitrates or other nitrogen compounds in the soil as to be practically inexhaustible for a long period of time, or is there some process, and if so what, by which the stock of nitrogen is replenished? I am not aware whether any data are available as to the total nitrogen supply, but it is improbable that there is any excessive quantity. Whence then does the nitrogen come?

The answer is, according to Professor Lowrie, that it comes during the fallowing process, and probably owing to the influence of minute organisms of some kind, which operate during the process. Observers in other countries have more than once noticed the occurrence on the surface of the soil of minute algæ, such as have already been referred to, and which, you will remember, have been proved to have the power of fixing nitrogen from the air, though probably they effect this only in association with bacteria. Professor Lowrie informs me that he has a strong suspicion that in this country something similar occurs, from appearances which he himself has frequently noticed on the soil. If that be so, the operation of fallowing becomes one of immense importance, and one to the proper carrying out of which great attention should be given. Clearly that involves a careful series of investigations as to the best time and the best manner of carrying it out. It is not known at present, certainly not in this country, under what conditions of moisture, temperature, and physical condition of the soil these organisms do their best work. It may be stated with confidence, therefore, that a series of careful systematic observations are necessary, involving extensive chemical and biological experiments, to decide upon the best method of fallowing, but at present no satisfactory provision is made for such work.

I have dwelt at some length on the supply of nitrogen to plants because it is a question of more general scientific interest than others, such as the supply of phosphates, potash, &c. It must not be supposed, however, that everything is known about these other questions. You are aware that in recent years superphosphate has been used in larger quantities in preference to other forms of calcium phosphate, such as bonedust, &c. In the manu-

facture of superphosphate the phosphoric acid is converted into a soluble form. Yet it does not by any means follow that it is absorbed by the plant in this form. In fact, it is recognised that in certain "sour" soils, deficient in lime, superphosphates may not only do no good, but may do harm. In ordinary soils containing a due proportion of lime, the soluble superphosphate is readily and thoroughly distributed through the soil by rain, but that being so distributed it at once gets neutralised by the lime and converted again into a less soluble phosphate. Even though thus changed, however, into a less soluble form, it is more readily available for the plant than if administered as bonedust, because it has become so thoroughly distributed that all the fine root hairs get ready access to it. It may be also that, although in a less soluble form than the original superphosphate, it is yet in a more soluble form than in bonedust; but that is a point not easy to decide. There are other questions about the use of phosphates, such as the conditions under which bonedust becomes the proper manure to use, upon which I have no time to dwell. As to the function of the phosphates, it has been pointed out by Professor Lowrie, in an address read before the Australasian Association for the Advancement of Science at its last meeting, but not yet published, that they not only supply the phosphorus necessary for the plant, but that they act indirectly in several important ways. They encourage the vigorous action of the soil ferments, they hasten maturity, and they enable cereals to build up tissues and develop grain with less transpiration of water. The importance of the latter effect in a country subject to droughts as this is, you will readily understand. It is well known that, acting upon these principles, Professor Lowrie has persistently advocated the use of superphosphates in this State, having himself proved experimentally that a liberal application of this manure always leads, other things being equal, to a largely increased yield, and his persistence has been justified by the result.

I understand that Sir John Quick has tabled a motion in the Federal Parliament in which it is proposed to establish a central institution such as that in Washington, in which systematic chemical, biological, and other investigations bearing on agriculture can be effectively carried out. These are indications of a move in the right direction. It is absurd to expect that any one man can do efficiently all the things which the principal of the Agricultural College has been expected to do in this State. One man cannot be principal of the college, take part in the teaching, travel round the country giving lectures and addresses, manage the farm on economical lines, and at the same time carry on scientific experiments, that is to say, he cannot do all these things as they

ought to be done, and as he would like to do them, if he be a man with his heart in his work. Let us by all means have a fully-equipped Agricultural College (and I may say here that I deeply regret to hear that it is proposed to reduce the salary which has hitherto been offered to the principal of Roseworthy College), but in addition to that, we want a thoroughly trained scientific staff to deal with the problems which face the agriculturist. Such a staff is at present maintained by the New South Wales Government, and one only needs to glance through the pages of the New South Wales "Agricultural Gazette" to see what magnificent work is being done there. But the conditions as to climate and soil which exist in New South Wales do not exist here, and if the resources of this State are to be developed to their utmost extent, we must have similar work done here.

Can anyone doubt that had there been a trained scientific staff to report on the conditions which would be likely to prevail at Renmark many failures and the loss of much money, with its consequent distress, would have been prevented? Professor Lowrie in his report on the condition of things at Renmark is, as becomes a Scotchman, sufficiently cautious, but it is perfectly obvious that, although with the data at present at our disposal, all failures are not explained, yet a very large percentage of them were due partly to a deficiency of nitrogen and phosphates in the soil, and partly to the deleterious action of the alkaline residues left by the evaporation of the irrigation water upon the roots of the trees. Had a thorough examination been made boforehand the experiments would either never have been made or would have been made under totally different conditions as to drainage and the supply of manure to the soil.

Besides the more purely chemical and biological questions to which I have given prominence, there are others of equal importance which need attention. Entomology, the original pathology of plant diseases, the diseases of wine, the relation of birds to insect life, and rural engineering are all urgently claiming attention. Some of you will remember a matter brought under the notice of the Society by Mr. Tepper a short time ago. He stated that in his boyhood galls were exceedingly scarce on our wattles and forest trees, whereas now it is a matter of difficulty to find a tree unaffected. He said, moreover, that he had found that parrots in captivity were exceedingly fond of these galls, presumably for the insects they contain, and he drew the conclusion that the destruction and driving away of the parrots is responsible for the enormous increase of the galls. Possibly the evidence is not sufficient to establish the correctness of his deduction, but at any rate the fact is beyond dispute that the wattles and forest trees are becoming largely affected, and it is

not too great a stretch of the imagination to suppose that at no very distant date our wattle bark industry may be seriously affected by a stunted condition of the trees, due to a large increase of galls. Whether Mr. Tepper's explanation is the correct one or not, matters not for my purpose. I have used it as an illustration for the desirability, I might say the necessity, for careful observation of the habits of our native birds in relation to insect life. If we knew more about these we should be in a much better position to advise remedial measures for insect pests with some hope of success.

Before concluding I should like to draw your attention to another matter totally unconnected with agriculture, in which I take some personal interest, and which is also of great importance to the material prosperity of Australia. I refer to the fisheries question. There can be no doubt that in many places fish are much scarcer than they used to be. Are there any remedies? I venture to say, yes. In the first place the habits of the various fish need to be carefully studied by trained observers, and that is the only way to obtain reliable information. Commissions of untrained men, however qualified they may be in other respects, who travel from place to place, and examine a few fishermen here and there, will never do any real good. In an article in the "Contemporary" for July of this year, under the name of Mathias Dunn, the writer refers to the enormous numbers of eggs laid by a mature fish, and to a belief which exists in some minds that only a small proportion of these eggs are ever hatched out. He says that by actual observation in some cases, he has proved that the vast majority of the eggs do hatch out (and it is reasonable to suppose that this is true in other cases) but that enormous numbers are destroyed while in a young and helpless condition. He instances the case of the turbot, which lays from two to twelve millions of eggs, according to the maturity of the parent. These fish leave the deep sea and spawn from three to five miles from the shore. The young fish make their way to the surface of the water to within about 100 yards of the shore, where they spend the first twelve months of their life. The mortality in passing over this narrow strip of sea is tremendous. They are attacked by birds from above and fish from below, and but a small proportion ever reach their destination. During a recent visit to Encounter Bay I was informed by the fishermen that a short time ago, when the barracoota were abundant on the coast, they had observed enormous numbers of minute fish (of what kind they did not know) near the surface of the water. They were being devoured in myriads both by gulls and barracoota, the latter being full of them. Something, therefore,

similar to what is described by the author of the article referred to seems to take place on our own coasts. Now, what is being done in America? Chad on the Pacific coast and cod on the Atlantic coasts are being hatched out in places in which the young fish are specially protected from destruction, and in which they are kept till able to look after themselves. Then they are turned out into the ocean. The result is an enormous increase of these fish in the places named, an immense supply of chad having become available, and a profitable cod fishery having been established in places where cod have never previously been found within the memory of man. The author also draws attention to the necessity for preserving estuaries of all kinds as natural spawning places, and for protecting the fish in such localities from indiscriminate destruction by nets. It has already been found necessary in some places in this State to place restrictions on net-fishing, and I am convinced that such restrictions should be extended to all places, such as, for instance, the Port River, which may be regarded as natural spawning places, and as suitable for the growth and protection of young fish. Necessarily such measures would cause temporary hardship to some fishermen, but that can scarcely be considered a serious objection in view of the serious issues involved.

It is obvious that one might include in an address such as this subjects of equal if not greater importance than those which I have briefly alluded to, such as, for example, the diseases of stock, and, in fact, the whole range of sanitary science; but I think I have said enough to indicate the value of scientific enquiry as a means of advancing the material wealth of the country. Its importance, in my opinion, can scarcely be over-estimated. I am not pleading here, be it understood, for the pursuit of science for science sake, though it could be shown by many examples that such a pursuit has led over and over again to results of inestimable value; I am pleading for scientific investigation which will inevitably yield almost immediately results of great practical value, and the sooner its importance is recognised the better will it be for South Australia.

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LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1901.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any changes in the addresses should be notified to the Secretary.

Date of Election.

HONORARY FELLOWS.

1893. *COSSMAN, M., Rue de Maubeuge, 95, Paris.
1897. *DAVID, T. W. EDGEWORTH, B.A., F.R.S., F.G.S., Prof. of Geology, Sydney University.
1888. *DENNANT, JOHN, F.G.S., F.C.S., Inspector of Schools, Camberwell, Victoria.
1876. ELLERY, R. L. J., F.R.S., F.R.A.S., Government Astronomer, The Observatory, Melbourne, Victoria.
1890. *ETHERIDGE, ROBERT, Director of the Australian Museum of New South Wales, Sydney.
1893. GREGORIO, MARQUIS DE, Palermo, Sicily.
1855. HULL, H. M., Hobart, Tasmania.
1892. *MAIDEN, J. H., F.L.S., F.C.S., Director Botanic Gardens, Sydney, N.S. Wales.
1899. *Meyrick, E. T., B.A., Ramsbury, Hungerford, Wiltshire, England.
1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Government Astronomer, Sydney, N.S. Wales.
1894. *WILSON, J. T., M.D., Prof. of Anatomy, Sydney University.

CORRESPONDING MEMBERS.

1881. BAILEY, F.M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1887. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, South Australia.
1880. *FOELSCHE, PAUL, Inspector of Police, Palmerston, Northern Territory, Australia.
1893. *McKILLOP, Rev. DAVID, Daley River Mission, N.T., Australia.
1886. NICOLAY, Rev. C. G., Fremantle, Western Australia.
1883. *STIRLING, JAS., Government Geologist, Victoria.
1893. *STRETTON, W. G., Palmerston, N.T., Australia.

FELLOWS.

1874. ANGAS, J. H., Adelaide, S.A.
1895. *ASHBY, EDWIN, Adelaide, S.A.
1893. *BEDNALL, W. T., Adelaide, S.A.
1887. *BLACKBURN, REV. THOMAS, B.A., Woodville, S.A.
1886. *BRAGG, W. H., M.A., Professor of Mathematics University of Adelaide.
1883. *BROWN, H. Y. L., F.G.S., Government Geologist, S.A.
1882. BROWNE, L. G., Adelaide, S.A.
1899. BROWNE, T. L., Adelaide, S.A.
1898. *BROWNE, J. HARRIS, North Adelaide.

1893. Brummitt, Robert, M.R.C.S., Gilberton.
1879. *Cleland, W. L., M.B., Ch.M., J.P., Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer in Materia Medica University of Adelaide, Parkside, S.A.
1895. Cleland, John B., M.B., Ch.B, Pathologist Prince Alfred's Hospital, Sydney, N.S.W.
1876. (L) Cooke, E., Commissioner of Audit, Adelaide, S.A.
1895. Cooke, John H., Adelaide, S.A.
1887. *Dixon, Samuel, Adelaide, S.A.
1896. Drummond, J. H. G., M.D., Pangarinda, Semaphore.
1893. Dudley, Uriah, White Rock S.M., Drake, N.S.W.
1890. *East, J. J., F.G.S., 3, Parade, Norwood.
1899. Fergusson, Andrew, Agricultural School, Adelaide.
1886. Fleming, David, Adelaide, S.A.
1882. Fowler, William, Melton, Yorke Peninsula, S.A.
1889. Fraser, J. C., Adelaide, S.A.
1880. *Goyder, George, F.C.S., Government Analyst, South Australia.
1887. Grasby, W. C., F.L.S., Adelaide, S.A.
1896. Greenway, Thomas J., East Adelaide.
1896. Hawker, E. W., F.G.S., Adelaide.
1899. *Higgin, A. J., Assistant Lecturer Chemistry, University, Adelaide.
1891. *Holtze, Maurice, F.L.S., Director Botanic Gardens, Adelaide, S.A.
1883. *Howchin, Walter, F.G.S., Lecturer on Geology, The University, Adelaide.
1901. Haslam, J. A., B.Sc., Registrar of the School of Mines and Industries, Adelaide.
1893. James, Thomas, M.R.C.S., Moonta, S.A.
1900. Johncock, Chas. F., Wilmington, S.A.
1853. (P) Kay, Robert, General Director and Secretary South Australian Public Library, Museum, &c., Adelaide, South Australia.
1899. Kleeman, Richard, University, Adelaide, S.A.
1899. *Koch, Max, Port Pirie, S.A.
1884. Lendon, A. A., M.D., Lond., M.R.C.S., Lecturer on Forensic Medicine and on Chemical Medicine, University of Adelaide; Honorary Physician Children's Hospital, Adelaide, S.A.
1856. Lloyd, J. S., Adelaide, S.A.
1897. *Lea, A. M., Government Entomologist, Hobart, Tasmania.
1888. *Lower, O. B., F.Ent.S. Lond., Broken Hill, N.S. Wales.
1874. Mayo, George G., C.E., Adelaide, S.A.
1888. Molineux, A., F.L.S., Secretary Agricultural Bureau, Adelaide, S.A.
1897. *Morgan, A. M., M.B., Ch.B., Adelaide, S.A.
1884. Munton, H. S., Adelaide, S.A.
1859. (L) Murray, Hon. David, Adelaide, S.A.
1896. *Parker, Thomas, C.E., Rockhampton, Queensland.
1883. Phillipps, W. H., Adelaide, S.A.
1886. Poole, W. B., Adelaide, S.A.
1892. *Priestley, P. H., Parkside, S.A.
1885. *Rennie, Edward H., M.A., D.Sc., London, F.C.S., Professor of Chemistry University of Adelaide, S.A.
1869. *Rutt, Walter, Chief Assistant Engineer, Adelaide, S.A.
1891. Selway, W. H., Adelaide, S.A.
1893. Simson, Augustus, Launceston, Tasmania.
1857. Smeaton, Thomas D., Blakiston, Littlehampton, S.A.
1900. Smeaton, Stirling, B.A., C.E., Adelaide, S.A.
1871. Smith, Robert Barr, Adelaide, S.A.

1881. *Stirling, Edward C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Professor of Physiology University of Adelaide, Honorary Director South Australian Museum, Adelaide, S.A.
1886. *Tepper, J. G. O., F.L.S., Entomologist South Australian Museum, Adelaide, S.A.
1897. *Torr, W. G., LL.D., M.A., B.C.L., Way College, Adelaide, S.A.
1894. *Turner, A. Jefferis, M.D., Brisbane, Queensland.
1889. Vardon, Hon. Joseph, M.L.C., J.P., Adelaide, S.A.
1878. *Verco, Joseph C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics University of Adelaide, S.A.
1883. Wainwright, E. H., B.Sc. Lond., St. Peter's College, S.A.
1878. Ware, W. L., J.P., Adelaide, S.A.
1859. Way, Rt. Hon. Sir Samuel, Bart., D.C.L., Chief Justice and Lieutenant-Governor of South Australia, Adelaide, S.A.
1886. *Zietz, A. C., F.L.S., C.M.Z.S., Assistant-Director South Australian Museum, Adelaide, S.A.

Associates.

1901. *Basedow, Herbert, University, Adelaide, S.A.
1901. Collison, Edith, B.Sc., Adelaide, S.A.

APPENDICES.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

EIGHTEENTH ANNUAL REPORT OF THE COMMITTEE,

FOR THE YEAR ENDING 30TH SEPTEMBER, 1901.

Evening Meetings.—Eight evening meetings have been held, at which the following papers, &c., have been read by the undermentioned authors :—

1900.

Oct. 16—"Colour in the Lower Animals," J. Aitken. "Notes on the Method of Fertilization of various Flowers," T. D. Smeaton.

Nov. 20—"Practical Demonstration in Rock Sectioning," E. J. Bradley.

1901.

April 16—"Notes on a Northern Trip," S. Smeaton, B.A.

May 21—"Observations on the Boys' Field Club Easter Excursion at Normanville," R. J. Clucas.

June 18—"Botanical Notes" (Teratology—Weather Forecasts by Plants—Diseases in Plants), T. D. Smeaton.

July 23—"The Roots of Plants —their Arrangement, Structure, and Function," E. Ashby.

Aug. 20—"Natural History Features of Lorne (Victoria)," W. H. Selway. "Insects and Entomology," J. G. O. Tepper, F.L.S.

Sept. 17—Chairman's Address (Annual Meeting), "The Flowers of Plants," S. Smeaton, B.A.

The attendance at these meetings, while not quite equal to that of last session, has been well up to the average of recent years. The course of papers on "Structural Botany," commenced last session, has been continued this year, when the roots and the flower have been dealt with. Besides botany, other widely

differing topics have been brought before themembers, such as colour in the lower animals, conchology, entomology, and rock sectioning.

The exhibits at these meetings have, as usual, been varied and interesting—birds, shells, plants, and insects forming the greater proportion. Amongst the exhibits may be mentioned the rare shell, *Acanthochites Matthewsi*, from Marino, and the local one, *Adamsia Adelaidæ*, from North Arm; the scale insect, which produces the manna found on Eucalypts; birds and plants from Nackara, not to be found near Adelaide; and beetles from various parts of the world. At one meeting it was mentioned that practical observations showed that the garden flowers, *Kennedya nigricans* and *Clianthus puniceus* were probably fertilised by the agency of birds.

Excursions.—Twelve excursions have been held during the year, of which the following is a list:—

1900.	Locality.
Oct. 13	River Sturt, from Blackwood to Darlington.
Oct. 27	Aldgate.
Nov. 12 (whole day)	Highercombe.
Nov. 24	Upper Sturt.
Dec. 8	National Park (Long Gully).
1901.	
Apr. 27	North Arm (by land, via Torrens Road).
May 25	(Henley Beach fixed, but not held, owing to wet weather).
June 22	Henley Beach.
July 20	Black Hill.
Aug. 17	Paradise and Hope Valley Reservoir.
Sept. 2 (whole day)	Barossa Waterworks.
Sept. 14	Montacute.
Sept. 28	Bridgewater.

The foregoing list includes two whole-day excursions, and embraces some fresh localities. The longest trips were those to the country between Highercombe and the River Torrens (near its junction with Kangaroo Creek), and the Barossa Waterworks, both places being visited for the first time by the section. The walk down the River Sturt between Blackwood and Darlington took in some of the scene of Mr. W. Howchin's recent investigations in regard to the interesting Cambrian Glacial Age discoveries. In this connection it may be mentioned that in the Section's Reports for 1893-4 it is recorded that rock formation noticed at an excursion to the River Sturt on May 12th, 1894, were ascribed by Mr. J. G. O. Tepper, F.L.S., to the Pre-Cambrian age, and special reference to the specimens then collected was made at the next evening meeting—May 15th, 1894.

Not many plants prievously unrecorded by the Section have been found during the year's excursions, but *Adriana quadripartita*, from River Sturt, and *Eriostemon difformis*, from Barossa, have not hitherto been included in the reports. An example of double flowers of *Epacris impressa* (a rare occurrence) was recorded from near Aldgate. The section was indebted to Mr. H. J. Armitage, of Houghton; Mr. W. Goodwin, of Highercombe; Mr. O. E. Menzel and friends, of Aldgate; Mr. C. Curnow, of Montacute: and to Messrs. O. H. Rogers and R. Caldwell, of the Barossa Waterworks staff, for assistance in connection with excursions; whilst the members were again placed under obligation to Sir Josiah and Lady Symon for their hospitality in entertaining the party at Upper Sturt. One excursion only had to be abandoned on account of inclement weather, although on other occasions rain somewhat interfered with the success of the outings. With these exceptions, the attendance has been well maintained. The usual dredging trip was omitted this year, but it is intended to arrange one early in the forthcoming summer.

Native Fauna and Flora Protection.—A separate report from this Committee shows that during the year under review the Birds Protection Act was passed by Parliament.

Library.—The Library started last year in connection with the Section has had several additions made to it this session through the kindness of members and friends.

Financial.—The receipts from subscriptions have again considerably exceeded the disbursements, but there has been no unusual outlay to make demands upon the funds. The subscriptions, which have been handed to the Royal Society, total £15, while the payments amount to £9 8s. 6d. The Royal Society's grant for the year is £10.

Membership.—Fresh accessions to the roll of membership have been made during the year, but your Committee would be pleased to see a greater number availing themselves of the privileges offered by the Section. The number now on the roll is 83.

S. Smeaton, Chairman.

W. H. Selway, Hon. Sec.

Adelaide, 16th September, 1901.

THIRTEENTH ANNUAL REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE OF THE FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA, PRESENTED AT THE ANNUAL MEETING OF THE SECTION ON 17TH SEPTEMBER, 1901.

Though it has not been thought necessary to call the Committee together, the efforts of individual members during the past year have not been altogether unsuccessful in furthering the objects for which it was formed

The Birds Protection Bill has been passed with some of the amendments suggested by us, others being unfortunately rejected. Our great object has, however, been attained in getting a number of species of birds protected during the whole year. The Commissioner of Crown Lands has issued placards containing lists of the birds which may not at any time be killed, of those protected during different periods of the year, and of those not protected; and we have been assured that steps will be taken by the authorities to enforce the observance of the provisions of the Act.

Recently a motion was tabled in Parliament for the purpose of transferring seagulls from the protected to the unprotected list, and being unsuccessful in his efforts to see the mover, steps were taken by the Secretary to call the attention of members of the Assembly to the facts of the case. Letters from several persons combating the proposal were published in the *Register*, the result being that the member who was taking action asked that the motion should be read and discharged.

Attempts on the part of farmers to obtain perpetual leases of forest lands at Wirrabara have again taken place in the past year, and the Secretary has written several letters to the *Register*, which he has reason to believe have in some degree helped to prevent the granting of such leases, with the consequent destruction of the portions of the forests proposed to be leased.

With great regret we have to record the death of one of our members, Mr. Charles White, who for several years has taken great interest in the work of the Committee, more especially in that relating to the protection of birds.

SAMUEL DIXON, Chairman.

M. SYMONDS CLARK, Hon. Secretary.

Adelaide, 16th September, 1901.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Receipts and Disbursements for the Year 1900-1901.

Dr. Receipts.	£	s.	d.	Cr. Disbursements.	£	s.	d.
To Balance brought forward	5	14	5	By Printing	4	2	3
" Subscriptions	15	0	0	" Postages	3	16	0
" Grant from Royal Society	10	0	0	" Attendance	1	0	0
				" Sundries	0	10	3
					9	8	6
				" Subscriptions, as per contra, paid over to Royal Society	15	0	0
				" Balance in hand	6	5	11
	£30	14	5		£30	14	5

Audited and found correct,

J. W. BUSSELL,
J. S. LLOYD, } Auditors.

Adelaide, 17th September, 1901.

W. H. SELWAY,
Hon. Secretary and Treasurer.

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